THE WHITE HOUSE

WASHINGTON

July 23, 1969

MEMORANDUM FOR

Dr. Lee A. DuBridge Mr. Robert Mayo General George Lincoln General James O'Connell Dr. Paul McCracken Dr. Henry A. Kissinger

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Attached is a draft memorandum for the President regarding organization in the Executive Branch for Telecommunications Policy and Management. Can we have your comments by Wednesday, July 30th.

It is important to reach a decision on this matter as soon as possible in view of the need to recruit a new Director of Telecommunications Management.

> Clay T. Whitehead Staff Assistant

Attachment

THE WHITE HOUSE

July 1969

MEMORANDUM FOR THE PRESIDENT

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There are a number of important problems with respect to Federal telecommunications policies that suggest reorganization or at least revision of our policy machinery:

1. The communications industry is heavily regulated by the FCC and is heavily affected by the communications activities of Federal agencies. However, neither the FCC nor the executive branch have a significant capability for systematic analysis of telecommunications policies and opportunities, their impact, their effectiveness, or their costs. The cooperation between the FCC and various parts of the executive branch appears to consist largely of gentlemen's compromises among competing interests and philosophies. The increasingly rapid rate of technological change and introduction of new services makes policy-by-precedent increasingly less relevant, more restrictive, or counterproductive.

2. The so-called National Communications System remains a loose confederation af agency systems. In spite of the highly desirable interconnection capabilities that have been developed over the last few years, there has not been adequate specification of emergency capabilities, hardness, and priority override features necessary to permit informed decisions about the adequacy, performance, and cost of the system. No one seems to know whether a "unified" NCS is desirable, what it means, would cost, or would accomplish.

3. The extremely rapid rate at which communications are growing in the United States has brought about increasing conflicts over the use of various parts of the frequency spectrum and the beginnings of a spectrum shortage crisis.

Federal organization weaknesses:

Since World War II, there have been a number of studies of Federal communications organization and a number of reorganizations and shifts of responsibilities within the executive branch. None has

proved particularly satisfactory, and, indeed, there does not seem to be any neat solution to this problem. The lack of a good solution apparently is due in part to the quasi-independence of the FCC from the executive branch and in part to the conflicting requirements of Executive Office telecommunications coordination and individual (agency mission responsibilities.

The study of the Federal Government communications organization completed in December 1968 by the Bureau of the Budget provides a good statement of the shortcomings of our current organization. The Bureau of the Budget reported a need for:

- a strengthened organization for policy planning, formulation and direction of Federal communications activities.
- (2) a reorganized and strengthened National Communications System (NCS) within the Department of Defense.
- (3) an improved procurement and technical assistance effort in communications on behalf of those Federal agencies which do not now have adequate resources in this field.
- (4) unified frequency spectrum management process.
- (5) a coordinated technical assistance program for State and local government in this area.

The recently released GAO report focused on the government's communications and particularly the progress toward establishment of unified National Communications System directed by the President in 1963. The GAO also found a need for stronger coordination of government telecommunications planning, and recommended a single entity responsible for both planning and operation of the Government's telecommunications activities. GAO also recommended clarification of what the unified NCS is intended to be.

Current organization for communications policymaking:

The Director of Telecommunications Management (DTM) in the Office of Emergency Preparedness is now charged by Executive Order and Presidential memorandum with the responsibility for coordinating telecommunications activities in the executive branch. The DTM also is designated Special Assistant to the President for Telecommunications. However, the history of the organization reveals that attempts by the DTM to exercise leadership in cofmmunications policy have been largely ineffectual. This situation results from a number of factors such as organizational location, inadequate staff, and fragmentation of policy authority among half a dozen agencies with no one having overall responsibility. In view of its claimed responsibilities, the credibility of the DTM is questioned by agencies with operating responsibilities.

There is now no office in the executive branch with the responsibility or the capability to review national telecommunications policies as expressed in legislation and in FCC policies. The antitrust division of Justice has occasionally filed briefs on competitive aspects of decisions before the FCC, but these derive largely from antitrust considerations rather than from systematic analysis of communications issues. The Council of Economic Advisers has shown almost no capability or interest in telecommunications, and OST is certainly not equipped for addressing the fundamental economic and institutional problems of the industry and its regulation by the FCC. The Administration is therefore largely unable to exert leadership or take initiatives in spite of vulnerability to criticism for FCC policies and national communications problems.

Executive branch responsibilities:

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There are six major functions that are the responsibility of the executive branch in the telecommunications area:

- 1. Assignment of frequencies for Government communications.
- 2. Research and development.
- Analysis of technological and economic alternatives and formulation of recommendations for national policy with respect to telecommunications.
- 4. Definition and assurance of emergency communications capabilities.

- 5. Policy planning responsibilities for Government communications activities.
- 6. Procurement of Government communications services and operation of Government communications facilities.

Some of these functions are now being performed by the DTM or various departments. The problem we now face is which of these functions should be assigned to what agency and how they should be interconnected.

Agency views:

The Budget Bureau study of Federal communications organization made a number of major recommendations (see attached summary) and was recently distributed to the concerned departments. Agency views on the Budget Bureau recommendations have been received (summary attached). These views share a common theme that (1) stronger coordination from the top is required in establishing Government policy for its own telecommunications requirements and that (2) the Federal Government should take a stronger role in the evolution of national telecommunications to deal with the increasingly rapid rate of technological change and industry growth. There is also agreement that a much stronger analytic capability within the executive branch is needed to achieve these goals.

There is, however, no consensus among the agencies about the extent to which the Bureau's specific organizational suggestions will actually advance the above objectives. The history of this area suggests strongly that it will be unprofitable to seek further agreement among the agencies. There is no solution that will represent a desirable compromise to all concerned, and no solution appears sufficiently strong on its merits that it looms out as the obvious choice.

Alternatives:

A number of organizational arrangements have been suggested in the Congress or the press. These include establishment of a Department of Communications transfer of all DTM functions to an existing Cabinet department, and significant expansion within the Executive Office of the President by creation of a new Office. Determination of emergency communications requirements clearly must remain in ØEP. However, major involvement by the executive branch in nongovernmental communications policy matters could be centered in one of the Cabinet departments or in the Executive Offices.

There appear to be three feasible alternatives:

(1) Maintain essentially the status quo, but clarify and strengthen the conflicting Executive Orders through which the DTM derives his authority.

(2) Alter slightly the status quo by strengthening the DTM and including in addition a capability for analysis of non-Government policy issues that would enable the Administration to play an expanded role in that area. This alternative could lead toward considerable pressure for a separate independent office in the Executive Office in a few years.

(3) Create a new organizational unit in the Department of Commerce that would perform the needed analysis of major national communications issues; take an increasingly active role in advocating policy to the FCC and (through the President) to Congress; and eventually be responsible for unified management of spectrum resources for both Government and non-Government users. This alternative would require shifting of spectrum management responsibilities from the DTM, leaving only emergency communications requirements in OEP.

The first alternative would leave the Administration largely incapable of dealing with national communications policy problems. It also would do little to encourage straightening out of the acknowledged problems in the Government's own communications.

The third alternative is probably the best long-run solution. However, the Department of Defense has long taken the position that, for national security reasons, spectrum management responsibility for Government uses should remain in the Executive Office. There also would be opposition from the Congress and the FCC to moving non-Government spectrum management to the Executive Branch at this time since there is no demonstrated capability. It is probable that the second alternative would permit almost as much to be accomplished over the next two or three years as would the third option, since such a significant upgrading of capabilities is required. Furthermore, it would avoid the political opposition that could be expected to the more sweeping proposal.

We therefore recommend the approach of the second alternative above. This is outlined in more detail in the attached recommendation.

> Peter M. Flanigan Assistant to the President

Attachments

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BOB recommendations concerning Federal communications organization

The Bureau of the Budget report recommended that:

1. The Federal Government should establish a new and strengthened central policy and long-range planning organization for communications in an existing executive branch agency -- either Commerce or Transportation.

2. The NCS staff should undertake implementing studies (a) to transfer the Federal Telecommunications System from the General Services Administration to the Department of Defense for merger with the military administrative communications systems to provide service for all Federal agencies and (b) to appropriately locate and combine the roles and functions of the Executive Agent and the Manager of the NCS within the Office of the Secretary of Defense to provide unified guidance to the NCS from within the Defense Department. An effective mechanism should be provided whereby the member agencies of the NCS can advise and be consulted by the Manager, NCS.

3. The National Communications System staff within the Department of Defense should provide a central source of procurementrelated assistance for use by executive agencies.

4. The management of the Government's portion of the frequency spectrum should be a function of the new communications policy organization. If a single manager is provided for the entire spectrum, the total function should be placed in the new organization. The new organization should have a limited in-house research capability to support its frequency spectrum management and general policy development responsibilities.

5. The new communications policy organization should coordinate action on requests to Federal agencies from State and local governments for technical assistance in telecommunication and should provide such assistance to Federal agencies who lack in-house capability.

Agency views on Eudget Eureau recommendations

The Eureau circulated its study report among those agencies having significant telecommunications responsibilities and requested their views. The following is a summary of the agency responses: -- The <u>Department of Commerce</u> concurred in the report's major findings and recommendations. The Department specifically supported vesting overall management of the spectrum in one executive agency. Its comment on the report's major organizational recommendation -- "The establishment and location of such an agency in an existing Department will enable meaningful Executive Branch participation in the development of comprehensive national policies."

--- The <u>Department of Defense</u> (including the views of the Executive Agent of the National Communications Systems) agreed with the need for a new and strengthened policy and long range planning organization but believes that it should be constituted as a separate office outside OEP but in the Executive Office of the President. The DOD does not concur in the need for an implementing study to transfer the Federal Telecommunications System from GSA to Defense nor does it favor a combination of the roles and functions of the Executive Agent and Manager, HCS within the Department. Instead, it recommends an exploration in depth of the entire HCS structure and concept. -- The Federal Communications Commission agrees that the role of the Federal Government in communications can and should be strengthened and made more /effective but within the organizational framework presently prevailing. The FCC completely disagrees with the recommendation to establish a single radio spectrum manager in an executive agency in that it would adversely affect the Commission's functions.

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The <u>General Services Administration</u> agrees with all of the study report recommendations <u>except</u> the one that a strengthened NCS should be located in DOD. GSA states that a merger of the civilian and military administrative networks has "obvious merit" but it should not be organized within Defense.

The <u>Department of Justice</u> agrees with the formulation of a new communications policy organization. The Department disagrees with the transfer of the Federal Telecommunications System to Defense and questions the feasibility of assigning responsibility for procurement and procurement-related assistance for agencies without in-house capabilities to Defense.

-- The <u>National Aeronautics and Space Administration</u> -- (views not yet received).

-- The <u>Special Assistant for National Security Affairs</u> agrees in general with the study conclusions but does not believe that "policy guidance with respect to the objectives, requirements and composition of the NCS" should be vested in Commerce or Transportation. Further, he believes a National Security Council study should be initiated to re-examine the objectives and alternative system concepts prior to

any reorganization.

-- The <u>Office of Emergency Preparedness</u>-(including the views of the Director of Telecommunications Management) points out that the study report does not focus adequately on the emergency preparedness aspects of telecommunications management. General Lincoln proposes that the Office of Telecommunications Management remain under OEP until the emergency preparedness implications of relocation are examined thoroughly.

The <u>Office of Science and Technology</u> -- (views not yet received). The <u>Department of State</u> has no objection to the study report's proposals from the standpoint of foreign policy considerations and believes that "advantages would flow from a strengthened central policy formulation and planning organization."

--- The <u>Department of Transportation</u> agrees on the need for coordinated policy direction at departmental level, improved procurement and technical assistance, and the unification of radio frequency spectrum management. The Department differs with the study report in that it believes that the Executive Agent role provided by DOD for the National Communications System should not remain within Defense but should be transferred to the policy organization.

-- The <u>Central Intelligence Agency</u> aggrees with the need for a new and strengthened central policy organization but, since it should have direct access to the President, it should not be a subordinate function within a Department or Agency. CIA is opposed to relocating or reorganizing the Office of the Executive Agent, NCS before the policy organization is established and an assessment of its effectiveness completed.

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Recommendation

The Office of the Director of Telecommunications Management should be strengthened and expanded to enable the DTM to serve as the focal point for all executive branch telecommunications activities and to be the Administration spokesman on national telecommunications policy issues. The DTM would be expected to be the primary executive branch office for the analysis and formulation of recommendations for both national communications policy and Federal telecommunications procurement. These responsibilities would include:

- -- economic, technical, and systems analysis of communications policies and opportunities;
- -- taking an increasingly active role in advocating policy to the FCC and through the President to the Congress, to include specific recommendations on spectrum management for non-Government uses.
- -- management and allocation of Government spectrum use, to include development of improved spectrum management techniques aimed toward eventual unified Government and non-Government spectrum management.
- -- guidance and information to Federal, State, and local Government agencies in communications planning and procurement.
- -- responsibility for policies and standards for procurement of Federal administrative telecommunications services and/or systems.

A Telecommunications Research and Analysis Center would be established in the Department of Commerce, reporting to the Assistant Secretary for Science and Technology. The Center would be responsible for both technical and economic analysis and research, responsive to the needs defined by the DTM. The TRAC would incorporate the current research program of the Institute for Telecommunications Sciences, as well as appropriate elements of other Commerce activities in telecommunications. Its specific functions would include: establishment and operation of a national electromagnetic compatibility analysis facility.

- -- research and analysis of improved spectrum utilization techniques to support the DTM in Government spectrum management and in making recommendations to the FCC on non-Government spectrum management policies.
- research and analysis leading to the development by DTM of improved technical and operating standards.
- -- continuation of basic telecommunication science research and provision of services to other Government agencies and industry.

The DTM should be raised immediately to executive pay level IV and authorized an expanded staff that would include a limited capability for economic, legal, technical, and systems analysis. He would be expected to contract for significant portions of the research and analysis required to support his responsibilities and also to draw heavily on the Commerce Telecommunications Research and Analysis Center.

A NSSM should be issued as soon as the new DTM is selected. This study should define appropriate NSC machinery for dealing with national security and emergency telecommunications issues and should provide general guidance to the DTM on emergency requirements and policies.

Implementation

This recommendation could be implemented almost immediately through the following actions:

A. By Executive Order

-- clarify and bolster DTM authority and eliminate existing patchwork of Presidential memor anda and conflicting Executive Orders. The Office of Telecommunications Management should be institutionalized as a separate Office within OEP, eliminating the positions of Assistant Director and Special Assistant to the President for Telecommunications. The DTM should be raised to Level IV and should report to the President for all matters except emergency preparedness requirements, for which he would support the Director of OEP.

-- similarly clarify authority and responsibility of the Department of Commerce.

B. By Secretarial Order

-- establish a Telecommunications Research and Analysis Center under the Assistant Secretary of Commerce for Science and Technology.

C. Subsequent Action

Once sufficient capability in the analysis of national communications policy issues and the associated capability for improved Government and non-Government spectrum management is achieved, Government and non-Government spectrum management responsibilities should be consolidated. This almost certainly will require in a few years establishment of a new agency outside OEP, either in the Executive Office, in a Cabinet Department, or as an independent agency.

- -- at an appropriate time, introduce legislation to establish a new agency and transfer non-Government spectrum management from the FCC to the new agency; emergency preparedness functions would remain in OEP.
- -- at an appropriate later time, transfer to the new agency by Executive Order responsibility for procurement of Federal administrative telecommunications services and/or systems.

· RADIO Specialists CO.

2450 West Second Avenue

Denver, Colorado 80223

Telephone 744-3461

July 21, 1969

The Honorable Assistant Secretary of Commerce, Myron Tribus Washington, D. C. 20230

Dear Mr. Tribus:

I want to thank you and Mr. Richard Kirby for his careful response (dated June 25, reference R60) to my letter of April 21.

After reading Mr. Kirby's response, I fear that I have not adequately made my point concerning priorities in the allocation of money for research programs involved with the radio spectrum.

Certainly, there is some value in research which may find ways to permit more intensive sharing of frequencies allocated to the land mobile services. (The sharing techniques mentioned by Mr. Kirby on Page 2, Paragraph 1, may be indeed worthy of study. However, the Telecommunications Committee of the National Academy of Engineering has recently issued a report which pours considerable cold water on these approaches.) I cannot argue against study of the spectrum above 10 GHz, which will probably expand the useable spectrum to the substantial enrichment of our economy, nor can I argue against further refinement of our knowledge of the spectrum below 30 mcs.

However, none of these studies carry the potential for immediate benefits offered by study of the "Taboos" which determine the TV allocation table. The substantial growth portion of the radio communication industry lies in the frequency range between 30 and 960 megacycles. The land-mobile services, with their crying need for spectrum are located here, in addition to many government services, TV broadcasting, FM broadcasting, Aeronautical, and other essential services. Further, this is the frequency band in which many new services must seek accommodation if they are to become reality and begin a contribution to the national economy. It is in this portion of the spectrum that various

Two-way Radio - Personal Portable, Vehicular, Office. Automation and Control of Machines and Devices Through Radio Communications.

- Dimo . Barrin Trille

Mr. Tribus Page 2 July 21, 1969

types of hardware are ready and available, and new uses and services can be implemented almost as soon as allocations permit. Contrast this with the frequencies above 10 KMc, where substantial equipment development will be needed for most new applications. Also, contrast it with the frequencies below 30 mcs, where international factors severely limit change or implementation of new services. Insofar as immediacy of return is concerned, emphasis on the 30-960 mcs region seems proper.

Having identified this portion of the spectrum as worthy of priority attention, just what sort of attention should be given to it? I am very critical of the large amount of money that has been expended in the search for ways to further increase the intensive utilization of the 4.4% of this spectrum allocated to the Land Mobile Services. (The report of the Telecommunications Committee of the National Academy points out that; ".... while land mobile does not appear to be achieving the maximum efficiency of spectrum usage that is theoretically possible with the present technology, on the whole the efficiency surpasses that of other services with greater spectrum allocation.") Let us assume that research in this direction contributed an unlikely 50% increase in the ability to cram services into this 4.4% of this spectrum, and you have added only a trifle to the utilization of the 30-960 mcs region. On the other hand, consider a study of the 55.1% of this spectrum allocated to Television Broadcasting--here a 10% improvement could free spectrum greater than the total amount now allocated to land mobile! Consider further that a proper study of Television allocation Taboos could result in improvements on the order of 200%, 300%, or even more, and you have an idea of what could be gained! This 200% to 300% improvement is a realistic goal.

I believe that these factors show that the national interest dictates that a high priority be given to research with respect to proper re-engineering of the TV allocation tables and the "Taboos" which govern these tables. Activity in this direction has the highest probability of fast return, and the probability of greater return than any other research effort in the telecommunications area. Mr. Tribus Page 3 July 21, 1969

Granted that the other areas of telecommunications research mentioned by Mr. Kirby have merit, we come to the question of what type of research is likely to be undertaken by industry as a result of profit motives, and what part must be underwritten by government because it is unlikely that private industry can or will undertake them:

- 1. Compared to those frequencies above 30 mcs, there would seem to be little private incentive for research into uses of frequencies below 30 mcs, for the same reason that there is comparatively little incentive nationally. Remember that this portion of the spectrum constitutes less than one thirtieth of the band width available below 960 mcs.
- 2. The history of the land-mobile services has shown a succession of improvements in the utilization of the small space available. Channel width has been split several times. All segments of this industry, including the manufacturers of the equipment and the users of the service, have had the constant incentive to incorporate technology which will enable them to cram more stations into the available spectrum. The improvements in utilization which have been accomplished are the result of research and development undertaken and financed by the industry. There has been no need for government financed research in this regard.
- 3. Similar incentives are supporting a substantial amount of private research and development in the application of frequencies above 10 KMC. While industry will certainly grab whatever benefits it can from government research in this area, there is plenty of incentive for industry to do the job for itself.
- 4. I can see no similar incentives within the Television industry which would cause that industry to give serious research into the problem of obtaining more efficient use of TV spectrum. The industry has a tremendous vested interest in retaining the status quo. The existing TV Broadcasters have an understandable fear that any investigation of the TV Taboos will threaten their monopoly by making

Mr. Tribus Page 4 July 21, 1969

> room for competitive broadcasters. The set manufacturers may fear that the results could cause a few cents increase in the cost of manufacturing a TV set. Only the manufacturers of TV broadcasting transmitters and equipment might benefit, but this is an extremely tiny segment of the total industry.

Even if other claimants for the spectrum would undertake this job, their findings would be branded as biased, and the effort would then be for naught.

The only hope for this job, therefore, comes from having it done by government. As I said in my earlier letter, there is little likelihood of the effort coming from the FCC.

I have before me a news release, in which the FCC announced contracts for \$450,000 in studies awarded in 1969. Also, I have a list of the studies for which they are requesting appropriations for 1970. Although both of these lists include substantial sums to further explore ways of increasing utilization of land mobile frequencies, there is absolutely no mention of any study of TV allocation Taboos! I believe you can see why people in the land mobile field despair of any effort originating from that body!

Substantial portions of the work needed for Taboo re-evaluation has already been done as a part of programs carried out under the Department of Commerce during the last two decades. Notable examples are your development of optimum frequency assignment procedures in the 30-960 MHz band, refinement of information regarding propagation over irregular terrain, the related studies of population distributions around market centers, the work done with TASO concerning tolerable interference levels in TV sets. The results of these studies need only to be updated and correlated into the information needed for more sensible Taboos. The job is well on its way to completion--dropping it now would be a shameful waste. Mr. Tribus Page 5 July 21, 1969

I apologize for burdening you with such a long letter, but the length has been necessary to explain why this area of research deserves priority for available funds.

Sincerely yours,

William L. Detrik

William L. Detwiler

WLD:nch

cc: The Honorable Senator Gordon Allott The Honorable Congressman John Dingell Richard C. Kirby Dr. Clay T. Whitehead

ALLOCATION OF THE FREQUENCY SPECTRUM BETWEEN 25 AND 890 Mc.

Government UHF-TV **VHF-TV** FM Aeronautical Amateur Meteorological Maritime Space Research Astronomy **Operational Fixed** International Broadcast International Fixed Public Radionavigation Land Mobile Public Safety Police Local Government Fire Highway Maintenance Forestry-Conservation Special Emergency State Guard Industrial Power Petroleum Forest Products Motion Picture Relay Press Special Industrial Business Manufacturers Telephone Maintenance Land Transportation Motor Carriers Railroad Taxicab Automobile Emergency **Domestic Public Land Mobile** Auxiliary Broadcast



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July 22, 1969

MEMORANDUM FOR

Mr. Rosal 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. demestic 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

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MEMORANDUM

THE WHITE HOUSE

WASHINGTON

July 9, 1969

3:30 The following people will be coming to your 2:30 meeting tomorrow:

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Chairman Rosel Hyde
Asher Ende
Henry Geller
General James O'Connell
Ralph Clark
Rick Gould
Col. Tom Olsson
Don Baker
Dr. Willis Shapley
Tom Moore
Bill Morrill
Richard Gabel
Walter Hinchman

THE WHITE HOUSE

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WASHINGTON

July 8, 1969

DOMESTIC SATELLITE POLICY

Working Paper

The Federal Communications Commission has drafted a proposed Order outlining interim policies regarding the establishment and operation of communications satellite systems for domestic services. Briefly, this Order would:

- Authorize a single multi-purpose system to incorporate standard voice services, television distribution, and certain specialized data services.
- Establish an Advisory Committee to the Commission, consisting of the major competitors for commoncarrier and specialized satellite systems, for the purpose of developing a plan for the technical and operational design of the pilot system.
- Designate Comsat as Planning Coordinator for the development of this plan.
- Defer all decisions on potential ownership of pilot or operational systems, or segments thereof, until the technical design and operational plans are submitted to and approved by the Commission.

The Administration feels a more constructive approach to this issue is possible and seeks an interim position on domestic satellites which is more definitive and which promotes greater innovation and flexibility on the part of the private sector. There are two basic reasons for doing so at this time. First, there are a number of basic objections to the Commission proposal when it is examined in the context of U. S. communications generally. Second, this is probably the only major decision for some time that provides the leverage necessary to promote an examination of the need for extensive common-carrier regulation of all U. S. communications and to stimulate a more vigorous and innovative competition in the communications industry.

Background

The United States presently enjoys the most sophisticated, effective network of communications facilities and services of any nation, both common carrier and private. Because of our highly developed terrestrial systems, the benefits of communication satellites (or any new technology) are both less striking and less easily discerned in U. S. domestic services than is the case in other countries where satellites offer clear economic benefits.

Nevertheless, there is ample evidence that satellite technology could find many economic applications in the U.S. Specific proposals and cost analyses suggest cost of service advantages for some specialized services such as distribution of TV programs to local broadcast stations, communication with and between ocean vessels and high-speed aircraft, and meteorological data collection and exchange. Satellites may also enjoy a slight cost advantage for long distance carriage of "bulk" message and data traffic, though this is less certain at this time. Due to these generally favorable prospects, several major corporations (AT&T Comsat, ABC, GE) as well as public-interest groups (Ford Foundation) have indicated a willingness to undertake the risk of establishing domestic satellite systems for various specialized or multi-purpose services.

Despite this interest and promise, incorporation of communication satellites into the highly developed U. S. communications industry faces two serious impediments. First, wherever satellites appear competitive with existing terrestrial technologies, they pose a major uncertainty for regulated common carriers and threaten to weaken future rates bases. Second, FCC and Congressional policies make artificial distinctions between satellite and terrestrial technologies with respect to both ownership rights and public-interest objectives, and this raises both administrative and economic barriers to potential investors and users.

Evaluation of the FCC Approach

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The FCC approach to this policy problem has the following problems:

- It would effectively lock the U. S. for the foreseeable future into a multi-purpose operation typical of common-carrier systems and would therefore impede the development and application of satellite technology for the specialized services for which it appears most promising in domestic U. S. communications.
- (2) While the FCC cites the need to learn more about satellite technology and economics in domestic communications applications, the proposed Order would foreclose significant learning about the very kind of systems we know least about but which appear to offer the most potential.
- (3) It hinders the interplay of economics, technology, and operations by the industry which would stimulate active development of the potential for new uses and new services, by insisting on finding a way to accommodate the new technology to existing uses and operations and by forcing design of the system before the industry knows how ownership rights are to be established.
- (4) It promises a "least common denominator" compromise solution by, in effect, requiring consensus among a consortium of mutually hostile interests, thereby extending to the domestic scene the demonstrated faults this approach has produced internationally.
- (5) Finally, it places the burden of risk almost completely on public users of rate-regulated common carriers rather than on the private sector where it is appropriate, by insulating existing common carriers from "unfair competition" and by assuring adequate rate of return for the satellite system.

Action

The Administration considers this an important policy issue and expects to have something to say on the matter in a short period of time. We will immediately establish a working group with representation from DTM, CEA, NASA, Justice, and Commerce (with the FCC as an observer or member at their option) to attempt to work out an alternative approach. Our objectives would be to:

- forestall (at least temporarily) the need for automatic extension of common-carrier regulatory policies to satellite communications until more experience is gained in domestic applications.
- minimize the regulatory impediments to technological and market innovation.
- use this approach as a wedge to encourage more vigorous innovative competition among communications organizations.

A number of alternative policy approaches, including those of the draft FCC Order and the Rostow Report, have been compared as ways of achieving these objectives. The attached draft outlines a provisional policy that appears to offer the most promise in terms of both objectives and feasibility.

Attachment

Provisional Domestic Communications Satellite Program

Draft

There is general agreement that the first phase in implementing satellite systems for U. S. domestic communication services should be a provisional program, in order to resolve various technical, operational, and economic issues. This paper sets forth interim policies for ownership and operational arrangements that might guide such a program. These are proposed as an alternative to those set forth by the Commission staff, though the objectives are the same -- i.e., to hold open final ownership and other policy options pending resolution of the issues noted, while encouraging development of satellite services to begin.

The present situation with respect to domestic satellite services is quite analogous to that which existed for international services in the early 1960's. There is widespread feeling that such services may prove economically attractive, but there are major differences as to what may be the best operating mode or modes. Some favor multi-purpose, others specialized operation; some favor pre-assigned bulk transmission, others demand-assigned message service; some favor multi-beam antennas, others single-beam; and so on.

To help resolve the earlier differences about satellite operations for international service, NASA carried out a series of experiments, partly on its own and partly in support of private interests. These included the Telstar, Relay, and Syncom projects, each of which was strongly supported by its proponents as the optimum system. This led to the adoption of one basic operating mode -- i.e., the geostationary configuration represented by Syncom -- as clearly preferable for most communication satellites.

An interim domestic satellite communications program should be structured along lines similar to those which worked in this previous instance, with some modification to reflect both greater technological confidence and increased commercial interest. Specifically, NASA would serve as technical coordinator of the space segment and provider of launch services. Qualified private and public entities would be authorized to implement their individual projects on a competitive or complementary basis as they choose, including individual or shared ownership of both space and earth station facilities. NASA's function would be (1) to provide launch services; (2) to determine (in conjunction with the FCC) compatibility of the proposed satellites with respect to orbital location and other technical parameters; and (3) to assist, as requested, with the combination of individual projects on a single satellite. Assignment of these functions to NASA would be of particular benefit to those desiring to test relatively new uses and operational techniques (e.g., demand-assigned data networks, regional and/or nationwide video networks, special-purpose or temporary-use networks), while posing no burden to those contemplating more conventional operations. Parties desiring to construct and operate an entire satellite for their exclusive use would be free to do so, as would those who wished to launch a multi-purpose satellite for shared use or to combine individual systems on a single shared satellite for economy in launch and station-keeping.

The only criterion for authorization of proposed systems would be a determination by FCC and NASA of technical compatibility with respect to orbital location, noninterference with other communications services, and availability of spectrum. Ownership of all space segment and ground station facilities would be retained by the private sector. There would be no restrictions on types of organizations free to enter the field, except that existing common carriers would be required to do so through a separate affiliate. (This will require a consent decree waiver by the Department of Justice.) There would be no FCC regulation of services or rates except as parts of the terrestrial common-carrier system is involved. Similarly, there would be no Federal assurance of economic viability and no limitation on rate of return; all risk would be placed on the private sector. To complement these provisional policies, the FCC should permit terrestrial common carriers to engage in nonpredatory price competition with satellite systems.

To provide appropriate opportunity for venture capital in this area, each owner of a space segment would be assured use of his segment through 1979. The free entry aspects of this policy would remain in effect through 1974, at which time the entire provisional policy would be reviewed.

This provisional policy provides substantial encouragement for research by firms entering the satellite communications field. This can be expected to include research on new services, new markets,

and new technology, including far more exploration than at present in tradeoffs between ground and space segments. The NASA ATS experiment opportunity can be expected to be seized upon by potential entrants immediately. The FCC and NASA should evaluate the experimentation of the private sector and NASA should undertake a limited experimental program to augment private efforts if necessary.

Information is especially needed on interference between satellite systems and terrestrial facilities. Every effort should be made to avoid such interference. Because of the lack of experience with potential satellite-terrestrial interference situations, however, it is to be expected that some interference will occur in spite of best efforts by all parties. Potential but uncertain interference situations should not be grounds for refusing to authorize new satellite systems, but the new service should be held financially responsible for compensation of the pre-existing service for harmful interference.

The major arguments in favor of and in opposition to this approach are summarized below:

Pro:

- (1) Provides maximum learning about technical, operating, and economic aspects of satellite communications.
- (2) Encourages innovation and full realization of satellite potential through the benefits of competition.
- (3) Least delay in implementation (by avoidance of committee or consortium approach).
- (4) Avoids the type of problems which have arisen in INTELSAT consortium where full exploitation of new technology for a variety of public and private benefits has often been subjugated to limited commercial interests.
- (5) No single entity obtains any advantage in space or earth segment ownership nor in prestige, public awareness, or other intangible benefits.
- (6) <u>All</u> ownership options -- including possible public ownership of some domestic satellite systems -- remain open.

- (7) Provides time for subsequent assessment of domestic satellite and other communications prospects, without delaying experimentation and further technological development.
- (8) Most advanced technology (through use of NASA competence and objectivity).
- (9) Ease of including experimental studies (at government expense where appropriate) and greater opportunity for small-scale experiments such as data network, regional TV networks, educational/information networks, etc.
- (10) All risk is placed on the private sector, rather than on the public users of rate-regulated common carriers.
- (11) Provides valuable information on benefits and disadvantages of relatively free competition in bulk transmission in an area of rapid technological change that will provide needed perspective on FCC regulatory precedents that cannot otherwise be obtained.
- (12) Provides an opportunity for private enterprise to make a contribution in the area of various social and economic development problems that might be precluded under a tightly regulated single satellite system.

Con:

- (1) Spectre of government participation in private communication ventures.
- (2) Potential legal objections by Comsat?
- (3) Potential Congressional objections to NASA role?

OPEN ENTRY IN DOMESTIC SATELLITE

- A. The FCC proposal leaves as much room for competition and open entry as is presently feasible for an initial system.
 - 1. The earth station environment is open to all applicants including:
 - a. Existing general or specialized common carriers.
 - b. New general or specialized common carriers.
 - c. Individual users or groups of users.
 - d. ComSat, possibly.

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- 2. <u>Authorized users</u> -- Direct access to the space segment is not limited to common carriers.
 - a. Broadcast interests are assured of direct access now.
 - b. Commission will entertain requests for direct access by others.
- 3. Space segment ownership and management is limited.
 - Only one manager of the space segment is practicable for operational efficiency.
 - b. Space segment ownership will include ComSat.
 - c. Others may be added after consideration of technical plan and proposed services.
- 4. Number of systems -
 - a. Desirable for initial program to start with one system.
 - (i) Necessary now to use 4 and 6 GHz bands where equipment has been commercially developed, as use of other frequencies would entail delay for development of equipment and an international greement on new spectrum allocations.
 - (ii) Only one system appears practicable in the 4 and 6 GHz bands because of limited frequencies and the difficulties in coordinating with heavy terrestrial use.

b. If only one initial system is technically feasible in the 4 and 6 GHz bands, it should be multipurpose to provide as many services to as many users as possible.

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- c. Assuming more than one system is technically feasible in the 4 and 6 GHz bands, authorization of a specialized broadcaster system now would probably postpone a multi-purpose system for some time as a matter of economics.
 - (i) ComSat claims that the bulk volume of broadcast program distribution would be initially essential to a multipurpose system until other uses developed, and that it would not undertake to proceed without broadcast traffic.
- d. Multiple systems are not foreclosed for definitive arrangements, or even during the initial program if it should appear appropriate once the initial multi-purpose system is underway.
 - (i) The Commission has expressly not foreclosed a separate postal satellite system at any time.
 - (ii) Unique specialized systems such as an aeronautical system could be authorized at any time.
 - (iii) As many definitive systems of any kind could be authorized as may appear feasible and desirable, under the circumstances then prevailing. In other words, future open entry is not precluded.
 - (iv) The Commission would consider authorization of additional systems even during the initial period, if this appeared technically and economically feasible without undue prejudice to the initial multi-purpose system or otherwise desirable in the public interest.
- II. Exclusion of ComSat now would have undesirable consequences.
 - A. Authorization now of a specialized system (e.g., broadcaster) excluding ComSat would cause a donnybrook.
 - 1. Congress would, we believe, be forced to intervene as a result of charges by ComSat, etc.
 - 2. A legislative resolution would take several years, and might not result in open entry.

- 3. After enactment, a substantial additional time would be required to achieve an operational system.
- B. Delay would be undesirable.

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- 1. "The United States would lag behind other nations, perhaps to its prejudice.
- 2. All interested persons urging prompt action now.
- 3. Eager response to NASA's offer of use of its ATS satellites.
 - a. The proposals made are not technical experiments, but rather seek to achieve early inauguration of some operational services, e.g.:
 - (i) Educational interconnection
 - (ii) Radio network interconnection
 - (iii) Live news service to Alaska
 - b. NASA's experimental satellites (designed to push the state of the art) are not adequate for operational services, and the appropriateness of NASA's involvement in operational services on a regular basis may be questionable.
 - c. Use of NASA facilities to achieve some operations at an early date, would entail a large investment by ETV interests in additional earth station facilities for minimal service in comparison to what could be achieved from an initial multipurpose system where earth station costs would be shared.
- 4. Even if some service to some entities could be provided via NASA facilities, service desired by others now should not be delayed for an indefinite period.

Sousat

July 23, 1969

MEMORANDUM FOR RON ZIEGLER

Attached is a memorandum sent to the Chairman of the FCC informing him that the Administration intends to conduct a 60-day review of what should be our policies with respect to the introduction of communications satellites into the U. S. domestic communications industry.

This will be of interest primarily to the trade press and the business periodicals and we are not seeking publicity. However, I thought you should know about this in case you get some questions since it is of considerable interest in the communications industry.

The important points to note are (1) This is not a criticism of the FCC or any tentative FCC conclusions, but is rather simply in response to the Administration's general responsibility to contribute to a sound approach to this important policy question; (2) The Administration will in no way be concerned with which companies are allowed to enter this area or what specific authorizations they might receive, but rather with general policy and the institutional and economic structure of the industry; (3) The FCC has agreed to cooperate with us; (4) Industry will be consulted as a matter of enu-ze.

> Clay T. Whitehead Staff Annistant

Attachment

cc: Mr. Flanigan Mr. Whitehead Central Files

CTWhitlehead:ed

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

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> Clay T. Whitehead Staff Assistant

cc: Mr. Flanigan <u>Mr. Kriegeman</u> Mr. Whitehead Central Files

CTWhitehead:ed
THE WHITE HOUSE WASHINGTON

July 14, 1969

MEMORANDUM FOR TOM WHITEHEAD

FROM: JONATHAN ROSE

SUBJECT: DOMESTIC COMMUNICATIONS SATELLITE

I will be receiving a memorandum shortly from the Justice Department regarding our legal rights with respect to the planning for a Domestic Communications Satellite. It appears that under the Communications Satellite Act of 1962, a respectable argument can be made for the proposition that the President has been given long range planning and supervisory responsibility with respect to the creation of such a system. Therefore, we have a tenable argument in support of the proposed task force study.

We have, in addition, several procedural possibilities of delaying final FCC action in case of disagreement with our desire for a review. Given these facts, it does not seem to me that we should have too much trouble convincing Hyde that he should go along with our task force.

July 15, 1969

To: Mr. Jonathan Rose White House Room 9 - West Wing

Re: Domestic Communications Satellites

In regard to the FCC's impending decision on establishing a domestic communications satellite system, the question has arisen as to the powers of the executive branch to make the Commission stay its hand until the executive branch can formulate its views and present them to the Commission. The following alternatives seem available:

A. Prior to any FCC decision

The Commission's "Notice of Inquiry" in this matter cites as authority only the provisions of the Federal Communications Act of 1934 dealing with radio. $\underline{1}$ / However, any F.C.C. action concerning domestic communications satellites also appears to be governed by the Communications Satellite Act of 1962, 47 U.S.C. 701, <u>et seq</u>. ("CSA"). Section 701, subsections (a), (b) and (d) is broadly drafted to make the Act cover all

^{1/47} U.S.C. §303(g), which authorizes the Commission, <u>inter</u> alia, to "[s]tudy new uses for radio..", is the only legislative authority cited in the Notice of Inquiry.

communications via satellite. Subsection (d) specifically states that:

It is not the intent of Congress by this chapter to preclude the use of the communications satellite system for domestic communications services where consistent with the provisions of this chapter.

The CSA (47 U.S.C. §721(a)) grants the President broad powers to coordinate and supervise the activities of governmental agencies and "provide for continuous <u>review</u> of all phases of the development" (emphasis added) of a communications satellite system. §721(a)(2). These provisions arguably authorize the President to stay the Commission's proceeding. The provisions of §721(c), defining the FCC's powers in regard to communications satellites do not seem to suggest a contrary conclusion.

Therefore the President could exercise his powers under §721(a) in an attempt to hold up FCC action in this matter.

B. After FCC action

Two alternatives appear available. In any suit to enjoin the operation of an FCC order under 47 U.S.C. §402, the United States must be made a defendant apart from

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the Commission. The United States, via the Department of Justice, has on occasions "confessed error" on an administrative agency in such a suit -- i.e., the United States has aligned itself with the plaintiff in attacking the validity of the administrative order. Therefore, if a party to the domestic satellite proceeding brings such a suit, the executive branch would be in a position to seek the setting aside of an FCC order it considers unsatisfactory.

An alternative would be for the Department of Justice to petition the Commission for rehearing under 47 U.S.C. §405, as a "person aggrieved or whose interests are adversely affected" by the Commission's action. Affirmative action by the Commission on such a petition would solve the initial problem of putting the Administration's views before the agency. A denial of the petition would enable the Department of Justice to seek judicial review under 47 U.S.C. §402.

1/sk

Communications Act of 1934, as amended, and in addition includes, but only for purposes of sections 303 and 304, any individual, partnership, association, joint-stock company, trust, corporation, or other entity which owns or controls, directly or indirectly, or is under direct or indirect common control with, any such carrier; and the term "authorized carrier", except as otherwise provided for purposes of section 304 by section 304(b)(1), means a communications common carrier which has been authorized by the Federal Communications Commission under the Communications Act of 1934, as amended, to provide services by means of communications satellites;

(8) the term "corporation" means the corporation authorized by title III of this Act.

(9) the term "Administration" means the National Aeronautics and Space Administration; and

(10) the term "Commission" means the Federal Communications Commission.

TITLE II—FEDERAL COORDINATION, PLANNING, AND REGULATION

IMPLEMENTATION OF POLICY

SEC. 201. In order to achieve the objectives and to carry out the purposes of this Act-

(a) the President shall-

(1) aid in the planning and development and foster the execution of a national program for the establishment and operation, as expeditiously as possible, of a commercial communications satellite system;

(2) provide for continuous review of all phases of the development and operation of such a system, including the activities of a communications satellite corporation authorized under title III of this Act;

ized under title III of this Act; (3) coordinate the activities of governmental agencies with responsibilities in the field of telecommunication, so as to insure that there is full and effective compliance at all times with the policies set forth in this Act;

(4) exercise such supervision over relationships of the corporation with foreign governments or entities or with international bodies as may be appropriate to assure that such relationships shall be consistent with the national interest and foreign policy of the United States;

(5) insure that timely arrangements are made under which there can be foreign participation in the establishment and use of a communications satellite system;

(6) take all necessary steps to insure the availability and appropriate utilization of the communications satellite system for general governmental purposes except where a separate communications satellite system is required to meet unique governmental needs, or is otherwise required in the national interest; and (7) so exercise his authority as to help attain coordinated and efficient use of the electromagnetic spectrum and the technical compatibility of the system with existing communications facilities both in the United States and abroad.

(b) the National Aeronautics and Space Administration shall—

(1) advise the Commission on technical characteristics of the communications satellite system;

(2) cooperate with the corporation in research and development to the extent deemed appropriate by the Administration in the public interest;

(3) assist the corporation in the conduct of its research and development program by furnishing to the corporation, when requested, on a reimbursable basis, such satellite launching and associated services as the Administration deems necessary for the most expeditious and economical development of the communications satellite system;

(4) consult with the corporation with respect to the technical characteristics of the communications satellite system;

(5) furnish to the corporation, on request and on a reimbursable basis, satellite launching and associated services required for the establishment, operation, and maintenance of the communications satellite system approved by the Commission; and

(6) to the extent feasible, furnish other services, on a reimbursable basis, to the corporation in connection with the establishment and operation of the system.

(c) the Federal Communications Commission, in its administration of the provisions of the Communications Act of 1934, as amended, and as supplemented by this Act, shall—

(1) insure effective competition, including the use of competitive bidding where appropriate, in the procurement by the corporation and communications common carriers of apparatus, equipment, and services required for the establishment and operation of the communications satellite system and satellite terminal stations; and the Commission shall consult with the Small Business Administration and solicit its recommendations on measures and procedures which will insure that small business concerns are given an equitable opportunity to share in the procurement program of the corporation for property and services, including but not limited to research, development, construction, maintenance, and repair.

(2) insure that all present and future authorized carriers shall have nondiscriminatory use of, and equitable access to, the communications satellite system and satellite terminal stations under just and reasonable charges, classifications, practices, regulations, and other terms and conditions and regulate the manner in which available facilities of the system and stations are allocated among such users thereof;

(3) in any case where the Secretary of State, after obtaining the advice of the Administration as to technical feasibility, has advised that commercial communication to a particular foreign point by means of the communications satellite

June 4, 1969

Domitie satelle to

Dear John:

Thank you for your letter of May 20th and the copy of your P-4071.

I have mixed emotions about receiving this document. On the one hand, it raises a number of important issues that I think we should take into account in looking at how we will regulate domestic communications satellites, but, on the other hand, it drives home how far away from my electrical engineering I have drifted.

From my standpoint, the major point of your paper is the need for new policy and regulation approaches to insure that we realize the maximum benefit for our communications from new advances in satellite technology. I could not agree more, but as you can appreciate, there are many difficulties. However, I do feel strongly that these problems need attention. We are trying to come to grips with them and to get the government machinery more responsive to the problems. In this regard, I would enjoy the opportunity to talk with you should you get to town.

Thank you again for the paper and the stimulus, and I look forward to hearing from you again.

Sincerely,

Clay T. Whitehead Staff Assistant

Mr. John L. Hult The RAND Corporation 1700 Main Street Santa Monica, California 90406

cc: Mr. Whitehead Central Files CTWhitehead:ed

tope

The RAND Corporation

20 May 1969

L-9597

Dr. Thomas Whitehead The White House Office 1600 Pennsylvania Avenue Washington, D. C. 20500

Dear Dr. Whitehead:

The enclosed paper treats a variety of telecommunication issues of current concern, and suggests some interesting possibilities and new approaches that will become attractive with satellite systems. However, in order to be able to develop the hardware and exploit the satellite possibilities, as much of the microwave spectrum as is feasible for sharing with other applications should be made permissibly available as soon as possible. This would permit the United States to participate in the inevitable satellite "rush" without inviting pressure for partitioning and reserving spectrum and orbital space for every sovereignty.

It should prove beneficial to the United States and to the world to obtain acceptance of as much as possible of this shared spectrum allocation at the 1971 WARC. One of the principal objectives of this paper has been to expose the spectrum needs and opportunities to as many as possible who might influence the preparation and action at the upcoming WARC.

Two features related to broadcasting may be attractive for more immediate application to CATV and Pay TV. These are the separation of transmission and programming; and the narrow-band return link to monitor channel tuning and Pay TV usage, and to provide polling services. The possibilities of these two features for stimulating improved programming for the public good warrant their early serious consideration by any agency that may contribute to their incorporation into regulations. In this connection, we are hoping to investigate the economical and political impacts of instituting these features, and how this might be accomplished with minimal disruption of the TV community. Any comments related to the paper or to the efficacy of further investigation of the extension of the above features to CATV and Pay TV would be most welcome.

Sincerely yours,

. h. Hull

John L. Hult

JLH:fd Enclosure: P-4071 THE PROMISE OF UHF SATELLITES FOR MOBILE, BROADCAST, AND LOW-COST SERVICES AND RELATED NEW COMMUNICATIONS ALLOCATIONS, OPERATIONS, AND POLICIES

J. L. Hult

May 1969

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THE PROMISE OF UHF SATELLITES FOR MOBILE, BROADCAST, AND LOW-COST SERVICES AND RELATED NEW COMMUNICATIONS ALLOCATIONS, OPERATIONS, AND POLICIES*

J. L. Hult^T The RAND Corporation, Santa Monica, California

SUMMARY

This paper treats a variety of important controversial telecommunication issues of public, private and governmental concern. Revolutionary technological developments are confronting the traditional administrations with problems beyond their scope of efficient solution. There is a need for new policy and regulation approaches to insure a more orderly, beneficial exploitation of the technological potential. Prominent current issues include a variety of possible satellite relay applications, the spectrum needs of mobile services, and competing TV broadcast approaches. Associated with these issues is the competition for spectrum that emphasizes the need for a more satisfactory method than the traditional one of allocation by service. A suggested new approach is described and

The material on The Promise of UHF Satellites for Mobile, Broadcast, and Low-Cost Services was prepared for the Joint National Meeting of the AAS and ORSA on PLANNING CHALLENGES OF THE 70's IN SPACE AND THE PUBLIC DOMAIN, at Denver, Colorado, 17-20 June 1969.

^TThis paper, while expressing the views of the author, draws heavily on a background of research on the technology for communication satellites sponsored by the National Aeronautics and Space Administration under Contract No. NASr-21(02). Particularly, it benefits from RM-5785-NASA, *The Technology Potentials for Satellite Spacing and Frequency Sharing*, by J. L. Hult, S. J. Dudzinsky, N. E. Feldman, J. D. Mallett, N. C. Ostrander, and E. E. Reinhart, October 1968. (1) However, some of the views expressed here are outside the scope of any research currently sponsored at RAND, and the paper should not be interpreted as reflecting the views of The RAND Corporation or the official opinion or policy of any of its government or private research sponsors. Papers are reproduced by The RAND Corporation as a courtesy to staff members.

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illustrated that would include signal and equipment characteristic specifications and that would permit evolving a more intensive and beneficial use of much of the spectrum, particularly above VHF.

The possibilities of UHF satellites for mobile, broadcast, and low-cost services are explored. The promise is described for providing services to nominal 1-m-diameter earth apertures by superimposing the satellite down links on the current frequency allocations over the band from 450 through 1215 MHz. This should be possible without interference or penalty to currently allocated use and should provide better quality than that obtained from conventional service. This additional use of the spectrum (~ 1500 MHz of one-way spectrum when considering two independent polarizations) could be exploited at the discretion of the users for an abundance of land, maritime, and aeronautical mobile services as well as broadcast and other types of low cost service. A variety of new and improved services of these types might be provided by the UHF satellites at very attractive cost savings over other techniques. The technological potentials and alternative approaches for a number of the important hardware components that need to be developed are described.

The possibilities for the use of the spectrum above 1 GHz are discussed with emphasis on space services. It appears that the most limiting constraint on satellite relay applications for some time to come will be the down-link requirements for primary power in the satellites. Under these conditions and with contributing propagation and hardware factors, the achievable system performance degrades very rapidly with frequency, particularly above 10 GHz. Therefore, every effort should be made to first exploit fully the potential frequency bands below 10 GHz for satellite down links before considering the higher frequencies from which there will be a rapidly diminishing cost benefit with increasing frequency. The promise for satellite communication services is so great that it would seem appropriate that all the potential frequency bands for sharing with these services in the prime lower portions of the microwave spectrum should be evolved toward intense sharing with satellite down links. The up links can be shared at the higher frequencies that

-2-

are not so suitable for down links. The usage specifications and techniques that need to be evolved for intense sharing and exploitation of the spectrum are described.

A suggested allocation for space services above 450 MHz is presented which illustrates the new approach to allocation discussed earlier, accommodates the needs of the proposed UHF satellites, and exploits those portions of the remainder of the spectrum that could relatively easily accommodate the other allocated services to sharing with the proposed satellite services.

The systems design and coordination that would be required for the development of the UHF satellites is outlined. The coordination of frequencies, bandwidths, and modulations for efficient compatible global use for civil and military, domestic and international, aeronautical, maritime and land mobile, navigation and communication services is discussed. An appropriate partition of the spectrum involved must be designed for efficient use of the amplifiers and antennas over the large frequency bandwidth that would be spanned and for the evolutionary development of its use to full operational capacity. The satellite orbital configurations need to be determined that will efficiently satisfy the developing global needs. Longitudinal locations and orbital inclinations that best satisfy the coverage and navigational accuracy requirements, and geometric factors involved in antenna beam coverage, spacing, interchangeability, and reserve capacity are system design factors that need to be investigated.

The antenna development should be an important part of the program. The array-lens antenna systems for the satellites would be especially needed for achieving the desired cost benefit from the satellite relays. A development objective for the system design would be to provide the frequencies, bandwidths, directivities, gains, and switching versatility desired. The highest feasible gain with acceptable aberration, polarization isolation, beam overlap and side-lobe problems is another objective. The array-lens development would also be considered for potential attractive applications at frequencies higher than UHF. The 1-m-diameter adaptive array is an essential development for mobile

-3-

terminals. Its design must obtain the bandwidth and directional coverage, polarization response, interference rejection and speed of adaption that are desired. The systems design needs to be investigated to provide suitable efficient cooperative signal coding for the desired performance. Linear adaptive arrays for versatile efficient use with earth stations requiring simultaneous independent contact with a number of different satellite relays is another antenna development that could significantly improve the cost performance of future earth stations.

New policies should be considered for exploiting new approaches that will become possible for the organization and operation of UHF satellites and for new types of communication services. For example, it will become possible with relatively small spectrum cost to monitor millions of TV receivers or communication stations for complete identification, channel tuning, and yes-no type of response to a few questions. A central computer could, then, provide live totals for program analysis, advertising reach, polling assessment, and audience reaction in addition to recording for automatic billing for pay TV programs and communications services. An attractive opportunity is described for separating the programming and transmission in broadcasting. If the government provided and regulated the satellite transmission medium and sold the service time to interested program producers, regulation and control could be made a simple unobtrusive procedure with unparalleled independent freedom for programming and transmission. It would also be possible to extend this freedom to pay TV programming without any more constraints than exist for the theater, arena, or stadium, while giving the audience greater influence over the program and its cost. Under this operating arrangement it would be possible for the government to subsidize directly the transmission of educational or public information programs for the benefit of the public, both domestic and foreign.

A total of up to 60 independent TV channels of better quality than obtainable with other techniques could be made available at any and every location (rural or urban) from the spectrum between 710 and 1215 MHz at less cost to the producer than for conventional broadcast and for less consumer cost than for CATV. The service opportunities would become so

attractive that they would undoubtedly invite many new kinds of service including private use, especially at non-prime broadcast time. However, it is doubtful that satellites will be able to provide relay for all the video communications demands of the future, particularly in the densely populated regions of the world. Thus ground networks to facilitate the "Wired City" of the future will probably be needed in addition to the satellite relays that will be necessary for adequate access to vehicles and the less densely populated areas. The government operation of the satellites would facilitate the difficult phase of transition to full satellite broadcast operations without undue hardship to either the broadcasters or the public. A plan for accomplishing this is outlined. Also described is a way that this type of operation could be used to insure beneficial competition in most communication services essentially without economic regulation. The government-operated UHF satellite relay service is also readily adaptable to any kind of usage charge that may become desirable. Thus the UHF satellites could serve as a testing ground for a more effective economic basis than currently exists for assigning rights to the use of the valuable spectrum and orbit resources.

There are many attractive possibilities for UHF satellite services that justify early adoption of permissive frequency allocations that would not penalize the other users of this spectrum. The systems definition and design, and hardware developments could then be pursued vigorously with the possibility that operational services could begin by as early as 1975. The many international coordination and regulation problems and the difficult economic and regulatory entry barriers for these services indicate that it would be appropriate to assign to government agencies the mission of vigorous systems development (including allocation, coordination and regulation) and planning for operating the systems and monitoring and supervising the use of the spectrum involved.

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INTRODUCTION

The potential impact of satellites and the hurried efforts to exploit revolutions in the technology have combined with burgeoning demands and aspirations for spectrum-using services to precipitate unusual controversy over the use of the spectrum of telecommunication frequencies. In recognition of the need for policies that could cope with the developing situation with minimal impediments to the development of telecommunications, the President in August of 1967 appointed a Task Force on Communication Policy to investigate this problem area and submit a report that might provide a basis for governmental action.

In the meantime, the FCC has been responding to pressures to resolve issues in the areas of CATV, pay TV, domestic satellites, land mobile spectrum needs, and allocation proposals for the next World Administrative Radio Conference (WARC). Intelsat has been meeting in an attempt to arrive at a permanent arrangement for its organization and operation, and various International Radio Consultative Committee (CCIR) study groups have been holding interim meetings in preparation for the XII Plenary Assembly and the WARC of the International Telecommunications Union (ITU) to be held in 1970-1971. One of the purposes of the WARC will be to reach new agreements on the international use of the telecommunications spectrum. Of particular interest and importance will be the potential impact of space services on the use of orbital locations and frequencies.

Studies have indicated that technologically there is available a vast latent capacity for sharing orbits and frequencies with other services if it is properly used.⁽¹⁾ However, many factors other than purely technical ones will influence and control spectrum usage. As a minimum requirement, coordination between the various uses is needed to avoid grossly inefficient exploitation of telecommunication frequencies. Also, for beneficial development of the space services, their potential value needs to be recognized so that minor accommodations can be made in established spectrum usage.

The Communications Satellite Act of 1962 recognized space communication services as a potentially important component of an improved global

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communications network. It did not specifically recognize possibilities for domestic satellite services or the latent interest for commercial, public, or educational TV distribution. Neither did it consider direct TV broadcast from satellites, nor any role that such a service might play in the developing competition between cable TV, pay TV, and the more conventional terrestrial TV broadcast service.

At the same time that many spectrum demands for new space services are developing, the growth of established land and aeronautical mobile services far exceeds the conventional frequency allocations available for these services, ⁽²⁾ and the FCC is considering reallocating to these demands some of the currently less-used portions of the UHF spectrum previously allocated for TV.

In addition, as the quality, flexibility, and capabilities of space communication services become more generally recognized, a great demand for participation in their use can be expected. International communication and navigation for aircraft, ships, and all types of vehicles obviously will need access to space communications services. Also, many austere needs for space service capabilities by developing as well as by developed countries will spur the rush for claims on this valuable resource. Thus it may be expected that almost any capacity of space communication service that can be made available will be quickly absorbed with a clamor for more as long as there is no effective economic constraint to the spectrum obtainable.

There is an opportunity with space communications to establish new policies, services, and institutional arrangements that might significantly help to unsnarl the legal and political impediments to progress, and permit communications to blossom to its full technological potential and the pervading role for which it is ultimately destined. This paper discusses frequency allocations, potential technology developments, and organization and operation possibilities that if vigorously pursued and successfully implemented might have a dramatic effect on our society in the coming decade.

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ALLOCATION OBJECTIVES

Historically, the objective of frequency allocation has been to partition the spectrum into bands that would permit independent compatible assignment of frequencies within the bands with minimum risk of interference. At first, the ionospherically contained frequencies below VHF were of principal concern, and it proved satisfactory to make allocations by specified service, e.g., fixed, mobile, or broadcast. As higher frequencies were considered, the method of allocation by service was extended and is still the principal basis used for frequency allocation.

With increased spectral needs requiring more intensive and extensive exploitation of telecommunication frequencies and, particularly, to make more effective use of the growing space telecommunication services, it is appropriate to reexamine allocation objectives in an attempt to arrive at a more useful method of allocation.

An obvious allocation objective should be the sharing between uses involving transmitters, signals, and receivers that have compatible sharing characteristics. Uses may not be distinguished by conventional "services," but rather by signal characteristics. For example, if a synchronous orbital relay is to be used for direct broadcast or for various possible mobile services, the signal properties and receiver characteristics may be sufficiently alike so that it would not be necessary to distinguish between assignments. If the allocation is by signal and equipment characteristic specifications, there will be greater freedom of assignment and potentially a more intensive use of the allocation. The types of signal and equipment characteristics that would provide important distinctions for allocation considerations have been outlined elsewhere, (1) and include: minimum station separation distances when the same frequencies are used for both transmitting and receiving from the same vicinity; antenna size (or angular discrimination properties), including directions of use when control of interference depends on this factor; signal strength, polarization, and modulation properties when these features are used to control interference; and the inherent propagation suitability of various portions of the spectrum for various applications that are to be considered.

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There needs to be no specification on minimum station separation if different frequency bands are used for transmitting and receiving in the same vicinity (e.g., if frequency translation is provided in an orbiting relay). However, twice the effective spectrum could be made available in the prime portions if bands suitable for down links are not used exclusively for up links. It would be feasible⁽¹⁾ to use a band for both up and down links if some minimum separation of terminals can be specified and controlled. Also all the prime spectrum could be used for down links if the up links are at much higher frequencies not so suitable for down links. It may not normally be practical to use the same band for both up and down links for mobile uses, or for closely spaced broadcast receivers. These applications may better be accomplished with one-way use of the spectrum, that could be shared under proper conditions by all satellite relay services--mobile, fixed, and broadcast.

Antenna angular and polarization discrimination characteristics and directions of use for various applications are usually important factors in determining the potential for sharing frequencies between different services and within a service. In many situations it will be practical to take advantage of the directional properties of signals to permit simultaneous use of the same frequencies at a given location for a variety of services as well as simultaneous, independent, multiple reuse of frequencies in a given service. The directional discrimination capability (and cost) of antennas tends to increase with size; however, unconventional techniques such as adaptive arrays may be able in some situations to provide the required discrimination with significantly smaller apertures than with conventional antennas. Thus some important signal and equipment characteristics that could be specified for an allocation would include directions of use, antenna directional characteristics (or size of a given type of conventional antenna), signal polarization properties, and equipment polarization discrimination capabilities.

The quality of the message that is communicated will depend on the wanted signal strength and its modulation properties relative to the unwanted signals. To efficiently use a shared spectrum, limits on signal strengths

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and modulation properties should be specified in the signal characteristics of an allocation. In many situations it will prove advantageous to employ relatively large bandwidth expansion (e.g., large FM modulation index) in order to achieve greater total shared communication capacity with a given spectrum⁽¹⁾ and to improve the output message quality.

Various portions of the telecommunications spectrum have inherently greater suitability for some applications than for others, and these distinctions should be exploited wherever feasible. For example, antennas on vehicles become very costly if large apertures are required. Also, as previously indicated, mobile space services are better suited to one-way use of the spectrum, i.e., down links in exclusive bands from up links. Therefore, for space services to vehicles, those portions of the spectrum for which the size restrictions on the earth antennas are least limiting on the total orbital and spectrum circuit capacity should be used first. In the following sections, the reasons why UHF is inherently so suitable for mobile services are developed. In addition, above about 30 GHz, where a one-meter aperture may provide about as much directivity as can be used to operational advantage, the spectrum again may become inherently more suitable for some mobile applications. Observance of such relative suitabilities of various portions of the spectrum would not exclude their use for other services at the same time. Rather the signal and equipment specifications for allocations in these portions of the spectrum would be designed to best accommodate the mobile services; they might not provide as great capacity for fixed services as other allocation specifications would provide.

In a certain sense, the whole telecommunication spectrum might be justified as being inherently more suitable for mobile than for fixed communication services (particularly the space services), since for the mobile services there is no suitable alternative such as cable. Thus a higher priority should be given to mobile services, which ultimately should be able to derive a greater value from the use of the radiated telecommunication spectrum. The important question is, how much of the spectrum should be allocated in a way to provide the beneficial mobile communication services that might be needed in the foreseeable future? The

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remainder of the spectrum might then be allocated to provide greater total capacity for other types of service.

The vast potential capacity that could be obtained at UHF and above 30 GHz seems adequate to provide the currently conceivable mobile communications needs, including broadcast and all types of individual or personal mobile communications of the future. Therefore, the intervening spectrum seems most appropriate for allocation to signal and equipment characteristics that would permit the more intensive exploitation of the spectrum that would be possible with the larger earth antennas that are feasible with fixed communications services. In developing this portion of the spectrum, however, it would seem most appropriate to intensively exploit (using down links in all potential bands with two independent polarizations and with large earth apertures) the lower portions of this spectrum first, leaving the upper portion less intensively exploited, so as not to commit it any sooner than necessary to an allocation incompatible with possible future mobile services.

Another important allocation objective of a different type should be to obtain the needed allocations as soon as possible with the minimum restrictions that the shared services will allow so as not to discourage equipment development for attractive new applications. This applies specifically and emphatically to the spectrum most suitable for the proposed UHF satellites and for other promising space services.

The allocation objectives outlined here will be illustrated and developed in greater detail in the following sections. THE PROMISE OF UHF SATELLITES FOR MOBILE, BROADCAST, AND LOW-COST SERVICES

There is a variety of services that might advantageously exploit space communication relay capabilities, but which have earth-terminal antennasize limitations that would not permit them to achieve high angular resolution which would contribute to efficient isolation of orbiting relays. The mobile services are among these, and they should ultimately be given very high priority for the use of telecommunications frequencies, since they have no suitable alternative means of transmission (such as cable). In addition, the mobile services may involve vehicular terminals with large and rapid variations in orientation. It would be a considerable additional burden in most cases if it were necessary to track the desired signals mechanically, especially if a number of signals in different directions must be tracked simultaneously, as appears likely for some of the more attractive guidance and navigation systems. In order to avoid the mechanical problems, tracking may be done electronically, and in near-term this can be accomplished more easily and cheaply at lower frequencies for a given aperture size (exceeding a square wavelength). When the tracking problem has been accommodated by small-aperture earth terminals, there is no special benefit to be derived from completely geostationary satellites, so that orbital inclinations of up to 15° might be acceptable in order to provide full earth (including polar) coverage and to improve navigation system performance.

A nominal aperture size that could be made compatible with most vehicles of interest would be a nearly flat area one meter in diameter for integration into the roof or top surface of the vehicle. The principal system constraint on efficient satellite performance in the near term when operating into such small earth terminals is the satellite primary power requirement. For a given receiving aperture area, effective receiver sensitivity (equivalent noise temperature), and signal quality objective for specified modulation characteristics, there is a corresponding radiated power per square meter required at the earth's surface. All the requirements are most easily met with the near term art at the lower UHF, but above frequencies where cosmic or man-made noise too severely limit the easily obtained receiver sensitivity (say above 400 MHz).

Direct broadcast from satellites to one-meter-diameter earth antennas probably could not be justified for high priority in spectrum use except to provide service to mobile terminals or to regions of very limited ground network development. Fixed terminals in a developed ground network could be satisfied with cables or other alternative transmission means. However the growth in number of mobile terminals and in the extensiveness of their services should provide an increasing demand for communications performance which will include a variety of forms of broadcast as an important component of the total capability. Once the mobile use requirements have justified the priority for spectrum use for direct broadcast from satellites, then other earth terminals of comparable size could participate in the broadcast at no additional spectrum cost. Similarly, austere earth communications terminals of comparable size might advantageously participate in the use of the same spectrum as for mobile applications, since in most cases where there is no alternative ground network to provide suitable communications there will also not be a large demand for mobile communications or the associated spectrum in that vicinity.

Bandwidth Expansion

In space relay applications there are real advantages to the use of large bandwidth expansion ratios (rf-to-baseband bandwidth ratios of 10 to 20) for increasing the total orbital capacity. ⁽¹⁾ In addition, such large bandwidth expansion ratios can be used to significantly improve the quality of the signals, particularly broadband signals such as TV which can be degraded easily by annoying reflections and multipaths. The much smaller input wanted-to-unwanted signal ratio with large bandwidth expansion ratio that is required for a given output quality of signal will permit erasing most multipath effects even if the higher angles of arrival of the wanted signals did not permit significant discrimination with the antennas.

An exciting aspect of the use of UHF for mobile, broadcast, and low-cost services is that there appears to be a way of sharing a major portion of the UHF for these services without seriously impairing the currently allocated uses or jeopardizing their future development. The basic plan is to superimpose the satellite-relay down-link bands in the spectrum region from 450 to 1215 MHz and the up-bands in the region from 1400 to 2290 MHz.

Interference to Terrestrial Services

The rationale for the proposed down-link sharing is developed as follows: The terrestrial service mobile and TV broadcast receivers in these bands are not extremely sensitive and it does not appear that there will be any important justification for significantly improving their sensitivities in the future. The signal strength is such a rapid function of distance or height for terrestrial services that small changes in these parameters may negate or substitute for a costly improvement in receiver sensitivity. Also, the signal strength is directly proportional to transmitted power, which may be cheaply increased in many cases. In addition, the antennas used in these services either need to be nearly isotropic or they could avoid large gains in the direction of synchronous orbits. Combining these factors, it should be permissible to illuminate any portion of the earth's surface from synchronous orbit transmissions with signals which, if received through a linearly polarized antenna of unity isotropic gain, would not exceed the interference effects of 2000°K receiver noise. In most cases, this should not impair reception with the best commercial TV receivers (>9 dB noise factor), and only minor antenna directivity adjustments should be necessary to eliminate excessive inadvertent gains in the direction of the satellite signal. Therefore it should be possible to radiate circularly polarized signals from synchronous orbits with a total interference power density equivalent to that of 4000°K noise (2000°K on each of two orthogonal linear polarizations) through a compatible circularly polarized antenna with unity isotropic antenna gain without any unavoidable effect on these terrestrial mobile or TV broadcast services. This would be the total permissible radiation power density from all synchronous satellites illuminating a given area on the earth's surface in a given frequency band.

The problems of sharing between the space services also affects these limitations. If maximum space sharing is employed, the limitation on

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any one circular polarization from one satellite beam (when multiple beams per satellite are used) is about one-half of the above indicated total value. That is, for intense space sharing with many narrow satellite beams, at most one-fourth of the area in view from one orbit location can be used effectively. The remaining three-fourths of the area must be reserved for directional guard bands in order to provide the isolation needed for independent use of the satellite beams. On the other hand, a one-meter earth antenna could adequately isolate up to four or five satellites at about 30° spacing at the longest wavelength considered (450 MHz). Thus the combination of isolation with the satellite antenna beams and the isolation with the earth station antennas would permit approximately all earth areas to be covered from synchronous satellites on the full frequency band on two orthogonal circular polarizations. Therefore, only one-half of the total radiation limitation is permissible for any one circular polarization from one satellite beam at the lowest frequency considered when using one-meter earth antennas. For higher frequencies, the same size earth antennas should be able to isolate a larger number of satellites in the same orbital interval. Thus the space sharing limitation should reduce proportionately the permissible radiated power for any polarization from one satellite beam at the higher frequencies, e.g., for $\lambda = 1/3$ m as compared with $\lambda = 2/3$ m, only one half of the fraction of the total radiated power should be permitted per satellite.

Interference Effectiveness

A question that naturally arises at this point is, what is the permissible power spectral density in a structured signal such as TV that will produce the equivalent interference effect to that of a given thermal noise power? There is no simple answer to this question. For example, if the wanted and unwanted signals are both similar highly structured signals such as conventional vestigial sideband TV, the effective interference may be as much as 20 dB more effective or less effective than an equal power of thermal noise depending on the detailed control of the relative frequencies. The control necessary to assure that the interfering signal is no more effective than an equal power of thermal

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noise is usually practically achievable without excessive cost. Thus it should be a conservative assumption that a less structured signal such as large bandwidth expansion FM or digital signals could be interleaved, synchronized, and dispersed so as not to produce more effective or perceptible interference than an equal power of thermal noise against the UHF terrestrial TV bands. This is the indicated situation, for example, for the interference between large index FM signals, ⁽¹⁾ and it will be assumed to be the case here in further estimates of the feasibility of superimposing the space service frequency bands over the current allocations for terrestrial services in the UHF bands.

The Satellite-to-Earth Link

A more critical problem than interference to terrestrial services is the signal power available to provide the desired message quality for the satellite-to-earth link. For a given size of earth receiving aperture, the previously suggested limitation to the signal power from the satellite varies as $1/\lambda^2$, so as to be most critical at the lowest frequency. At 450 MHz ($\lambda \approx 2/3$ m), a 1-m-diameter aperture has a maximum theoretical gain with respect to isotropic for uniform illumination of approximately 14 dB. A practical gain for a reflector type antenna or an adaptive array for this wavelength and dimension might be closer to 11 dB. Also, the practical limit to the receiver sensitivity for mobile or TV reception at this wavelength might be about 600°K, i.e., about 5 dB better than the 2000°K equivalent input limit previously indicated from each of two opposite circularly polarized satellite signals as received by a circularly polarized isotropic antenna. Thus, the input carrier-to-noise ratio of 16 dB would provide a reasonable operating margin for the propagation characteristics of this portion of the spectrum for the large bandwidth expansion type signals that can provide the desired output message quality with input carrier-to-noise ratios approaching thresholds at about 10 dB.

It appears that noise need not be a serious problem to the operation of the satellite-to-earth link for the highest standards of output message quality. However, if the down-link is to operate successfully in the presence of a strong terrestrial TV or mobile signal within its bandwidth, special precautions will be necessary. This problem seems especially appropriate to the potential capabilities of small adaptive arrays.⁽¹⁾ They could in effect automatically steer nulls in the directions of (and adequately reject) a small number of much stronger interfering signals while still obtaining nearly full gain in the direction of the wanted satellite signal. Thus it should be feasible to operate the down-link while sharing the spectrum with intense terrestrial use for TV broadcast and mobile services. This type of antenna should also discriminate against man-made noise to obtain an effective system temperature of less than 600°K.

Illustrative UHF Partition

The UHF spectrum might be partitioned and assigned to space services in a variety of ways for shared operation with the current allocations. The allocations need not specify the service beyond that necessary to coordinate a global function, such as for air traffic control or navigation. An illustrative initial partition from which usage could evolve to satisfy the relative needs of the various services might be derived as follows. The space services could not very well be shared with radar radio-location services that could not operationally restrict their look angles away from the directions of the synchronous orbits. Thus the UHF spectrum below 450 MHz, between 1215 and 1400 MHz, and above 2300 MHz will be assumed to bound the down- and up-link bands to be considered for these space services. An initial partition of the down-bands might be as follows:

450 - 590 MHz for land and maritime mobile services
590 - 710 MHz for aeronautical mobile services
710 - 1215 MHz for broadcast and austere services

The down-links for a global navigation system might be imbedded in one or more of the above bands. Also, it may not be possible initially to share some portions of the band from 960 - 1215 MHz with current allocations.

The corresponding up-link bands might then be:

1400 - 1540 MHz for land and maritime mobile services with the radio astronomy portion of the band shared only on a coordinated noninterference basis by base stations in urban areas or locations that will not contribute beyond the indigenous noise to radio astronomy operations.

1540 - 1660 MHz for aeronautical mobile and radio navigation 1785 - 2290 MHz for broadcast and fixed austere services

In the spectrum use illustrated above, with large bandwidth expansion ratios so that the highest quality output message can be obtained with input wanted-to-unwanted signal ratios of less than 20 dB, it will be feasible to use the spectrum independently on two nearly orthogonal polarizations so as to double the effective spectrum available. ⁽¹⁾ This might be accomplished at UHF using circular polarizations to avoid serious propagation degradation of discrimination capability.

Since the up links proposed for the band 1785 - 2290 MHz would be from fixed earth terminals, it should be possible to share this band also for down links from other satellites to fixed or mobile earth terminals. As examples, the band from 1700 - 2290 MHz might be used for the down links from satellites spaced at least 10° apart in orbit to mobile, broadcast, and austere terminals with 1-m-diameter earth antennas; or it could be used for services to larger fixed earth antennas with much closer satellite spacing, e.g., 20-m-diameter earth antennas with satellites spaced at least 1/2° apart in orbit. The up bands for these services might be shared in the SHF bands from 4400 - 4990 MHz. However, if this up band is shared with those for other satellites with down bands in the region 3400 to 3700 MHz to large earth terminals, the earth transmitting antennas for the up links should be coordinated in size and signal characteristics for most efficient use of the orbit.

It will be shown later that the up links are much less of a challenge to technology and operational feasibility. They could be chosen to operate at much higher frequencies that are less suitable for down links.

Total Radiation from Orbit

In order to translate the previously discussed limits on flux density at the earth's surface into radiated power at synchronous orbit, it is only necessary to set the EIRP per Hz equal to the noise power density of a 4000°K receiver $(5.5 \times 10^{-20} \text{ w/Hz})$ multiplied by a factor to account for the free space path loss through an isotropic antenna, $(4\pi d)^2/$ $(\lambda)^2$. For a distance to synchronous orbit, d = 4 × 10⁷ m. EIRP per Hz \approx 0.031 w/Hz = 31 kw/MHz for $\lambda \approx 2/3$ m (450 MHz) and EIRP per Hz $\simeq 0.124 \text{ w/Hz} = 124 \text{ kw/MHz}$ for $\lambda \simeq 1/3 \text{ m}$ (900 MHz). If it was required to provide full global coverage, this might be accomplished with three equally spaced satellites, each with approximately 20 dB antenna gain. Therefore a maximum total power of about $(0.31 \times 3 \times 260) = 240$ kw would be required for full global coverage of the bands from 450 to 710 MHz, and (1.24 \times 3 \times 505) = 1880 kw would be required for full global coverage of the bands from 710 to 1215 MHz. Operationally, it would probably be feasible to fill the relays to less than one-half of theoretical capacity; for example, for the combined bands and full global coverage a maximum of about 1000 kw might be expected to be radiated toward earth from all the satellites in these bands. In addition, it is hard to imagine a need for more than one-tenth of the global coverage multiplied by the full frequency band for quite some time to come. Thus an initial planning goal should probably be concerned with less than 100 kw total power radiated toward earth from all the satellites in these bands. This might be provided by satellites radiating 3 to 5 kw each with a buildup to a global deployment of 20 to 30 of these satellites.

Satellite Antenna Size

An important consideration in the system design is the size of the satellite transmitting antenna and the corresponding beamwidth and coverage of the illumination at the earth's surface. The required coverage of the earth's surface will determine the total radiated power needed almost independently of the number of beams used to provide the coverage. If the area is covered with 100 times as many nonoverlapping beams, however, there is the opportunity to provide 100 times as many independent circuits or channels with the same spectrum, message quality, and total power consumption. Also, with many narrow beams it is possible to shape the coverage more efficiently so as to include only those areas desired. Thus as the circuit or channel demand increases so that the larger individual satellite capacities can be exploited, it will prove advantageous for capacity and costs per circuit to increase the satellite antenna sizes within practical operational limits.

Retrodirective Systems

The operational constraints for many mobile and TV applications make consideration of retrodirective systems very attractive, since the switching problems between many independent beams may be handled so simply. For such systems the satellite relayed signal is returned on a beam centered on the originating transmitter, and the beamwidth or earth radius of communication coverage is determined by the effective size of the retrodirective aperture. From an operational standpoint most land mobile services would be satisfied with a 100 km communications radius (many operate with ranges of 15 to 30 km). Most conventional TV is limited to a nominal coverage radius of about 100 km, and most metropolitan areas could easily be covered with a radius of 100 km. This 200 km beamwidth (0.005 radian) is the limiting beamwidth that will be considered, and initial systems might more appropriately have five times this beamwidth (1000-km-diameter coverage); this would be the minor axis of the ellipse-like coverage on the earth's surface with the major axis being typically twice this large.

There is a variety of retrodirective techniques that might be used. The three which will be compared here are an active Van Atta array, an active corner reflector, and an array-lens antenna system.

A Van Atta retrodirective antenna couples conjugate pairs of elements in the aperture with equal lengths of two-way transmission line so that the system behaves very much like an equivalent area of corner reflector. In order to be useful in the proposed application, it would need to be active and provide considerable amplification of the signals. This would require frequency translation with proper phase front preservation in the transmission in both directions between conjugate pairs of antenna elements. There are several important problem areas or deficiencies with the Van Atta retrodirective technique for the application of interest here. Every transmission line connecting conjugate pairs of antenna elements must be equal in length to that needed for the greatest span which is the largest diameter of the aperture. For the large antennas with many elements of interest here, the weight and volume of the stable transmission line required becomes prohibitive. (This also will tend to be the case for any conventional phased array when many simultaneous independent beams must be formed.) In addition, the complexity of phase preservation *over the desired bandwidths* through frequency translation, full amplification, and transmission is a very formidable problem. Also, the system is vulnerable to (i.e., cannot discriminate against) capture and degradation through overload by a strong signal within its active bandwidth from any direction within its field of view. Furthermore, the system is not easily adapted to modes of connection other than the retrodirective one.

The active corner reflector would consist of an active array for one of the three faces of a corner reflector. Again, it would be necessary to preserve proper phase through frequency translation and full amplification over wide bandwidths. This technique has all the characteristics and problems of the active Van Atta array except for the transmission lines. For the active corner reflector the coupled receiving and transmitting antenna elements are the same (or located at the same place) so that the length, volume, and weight of transmission line can be minimal or unimportant.

The array-lens antenna⁽³⁾ in rudimentary form consists of two flat backto-back arrays, with each elementary antenna element of the front array (facing the earth or object region field of view) connected to its corresponding element of the back array (facing the image or feed region). By adjusting the length of coaxial cable coupling the front and back elements to provide delays equivalent to a convex lens over the whole aperture, the focal length of the system can be designed so that there will be a one-to-one correspondence between each part of the object region and a part of the image region. The image region contains separate antenna feeds to sample the image for receiving or to illuminate the object region through the active lens for transmitting. For receiving, the system behaves analogously to a camera--the feed antennas in the image region record the emanations within the field of view of

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the lens as the film does in a camera. The array-lens system does not have the transmission line burden of the Van Atta or conventional phased arrays; it does not have the bandwidth and phase front preservation problems of the other systems; it accomplishes most of the amplification in the image region where phase stability has little or no effect on the antenna performance; it can limit capture effects to within only the narrow beamwidth of the strong signal and to the bandwidth of the particular amplifier involved in the image or feed region; and it can readily be adapted to any other switching between beams in addition to-or instead of--the retrodirective mode. Most of these features appear attractive to exploit for the applications considered here.

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Rough Cost Estimates

In order to obtain an indication of the cost of the satellite portion of the system, it is necessary to select appropriate illustrative sizes for consideration. For this purpose an initial system satellite with a 25-m-diameter aperture radiating 3 to 5 kw of r-f power is considered. This satellite could employ 200 m² of sun-oriented solar cells and the total orbiting weight might be 5000 to 7000 lb. It is estimated that this satellite might be developed by 1975 and that the cost per satellite in orbit would be in the neighborhood of \$50 million if 20 to 30 are deployed, or \$10 million per year for a five-year orbiting life. Similarly, a more advanced satellite might eventually (after 1980) have a 100-m-diameter aperture radiating 50 kw of r-f power and cost about \$60 million per year per satellite.

It would require an EIRP of 16 kw/MHz from the satellite to provide a carrier-to-noise ratio of 16 dB in a 580° K receiving system with an effective aperture of 0.4 m². If a 25-m-diameter satellite aperture is used it could provide 40-dB antenna gain over the frequency range from 450 to 710 MHz. The satellite transmitting power required would then be 1.6 w/MHz, and 5 kw of radiated power would provide 3125 MHz of independent spectrum which would be adequate for 31,250 two-way voice circuits (at 50 KHz per one-way voice circuit). If used to capacity, the satellite portion of each two-way circuit would cost \$320 per year. The number of users that can be accommodated per circuit will depend on

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the usage and is likely to range from 10 to 100. If the satellite is filled to 50 percent of capacity, the prorated cost per user would then range from \$64 to \$6.40 per year. This is a small cost compared to that of providing and maintaining a mobile two-way terminal at a nominal capital cost of about \$1000.

The same satellite system could provide 46-dB antenna gain over the frequency range from 710 to 960 MHz. The satellite transmitting power required would then be 0.4 w/MHz, and 5 kw of radiated power could provide 12,500 MHz of independent spectrum in 25 or more independent beams. At 50 MHz per TV channel, this 12,500 MHz could provide 250 independent TV channels for a cost of about \$40 thousand per TV channel per year (10 million/250). This is less than the transmitting costs for a conventional terrestrial TV channel and the area of effective earth coverage would be typically 40 to 50 times as great. The earth receiving terminals, including the small adaptive array and all the equipment necessary to convert the signals for acceptance by a conventional TV receiver, should be available in mass production for significantly less cost to the user than typical (\$50 to \$100 per yr) CATV service.

If there was a demand to justify the capacity of the large advanced satellites, they would provide 16 times the antenna gain and 10 or more times the transmitting power for only about 6 times the cost. This would reduce the satellite portion of the cost per circuit or channel by a factor of 25 or more. However, since this portion may already be only a minor fraction of the total system costs, the most important benefit from increasing the satellite antenna size would be the increased circuit capacity possible that might be needed after 1980.

In any of these satellite systems, one satellite would be able to provide only a small portion of the total orbital radiated power potentially feasible in the spectrum being shared. Thus if the versatile array-lens type of satellite system is used with a number of satellites always within view of any earth area, the coverage to any area can be insured against failures of a particular beam or satellite by activating the proper coverage of that area with the unused capacities of other satellites. In this way an adequate reserve and contingency

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capability can be maintained and spread out over many satellites so as to reduce its cost per satellite to only a small fraction of that for one-for-one redundancy.

The Earth-to-Satellite Link

The link up to the satellite is postulated to use considerably higher frequencies and could be configured quite differently from the down link. It would probably be desirable from an operational standpoint to use comparable satellite beamwidths and earth coverage for both links. Therefore, with the previous illustrative spectrum partition, the satellite aperture diameter for the up link will be assumed to be 0.4 of that for the down link. If an array-lens configuration is employed the central 0.4 of the diameter (~ 1/6 of the area) could be used exclusively for the up link without significantly degrading the performance of the down link. For the illustrated down-link aperture diameter of 25 m, the up-link diameter would then be 10 m. If a 1000°K up-link receiver is used, a thermal noise power of 7×10^{-16} w per 50 KHz of r-f bandwidth is obtained (the bandwidth used per voice channel). It will be further assumed that a generous carrier-to-noise ratio of 20 dB is used at the input to the satellite receiver so that the up-link contribution to the circuit noise is relatively minor. Then the EIRP required at an earth station per 50 KHz r-f voice channel is 17.5w (12.5 dBw). At 1400 MHz in the radio astronomy band, a base station using a 2-m dish could easily provide 26.5 dB antenna gain so that only 40-mw of radiated power would be required per voice channel. As another illustration, an aircraft with 1/3-m aperture could provide 12.5 dB antenna gain at 1600 MHz so that 1 w of radiated power would be required per voice channel, or if a very small antenna giving upper hemisphere coverage is used, about 10 w of radiated power would be needed for the same capacity. Thus the operational configuration of the up links can be designed to easily meet the requirements for overcoming thermal noise, and it may prove desirable to place some of the up links at much higher frequencies which are less suitable for down links.
POSSIBILITIES FOR THE SPECTRUM ABOVE 1 GHz

The most limiting constraint on the possibilities for the spectrum above 1 GHz for satellite relay applications is the down-link requirements for primary power in the satellite. This is particularly emphasized if many small earth terminals are to be served, as was illustrated for the UHF satellite applications previously discussed. However, the importance of this constraint in determining the relative utility of various frequencies for satellite down links is best illustrated in Table I in terms of feasible capacities per satellite relay (and approximate relative circuit capacity per dollar of system cost). For the frequencies indicated in Column (1), the values of radiated power, Pe, in Column (2) might be expected from 12 kw of primary power obtained from 200 m² of sun-oriented solar cells after two years of environmental degradation. The primary power could be obtained for about 1000 lb in orbit, and is about as large an operational supply as might be feasible to consider by the mid 1970s. The radiated powers assume solid-state transmitters suitable for use with antenna arrays of many elements, and credit the transmitters with higher efficiencies than are currently available in the laboratory at the higher frequencies, but which should be achievable with further development.

The attenuation in Column (3) for one-way propagation through the atmosphere will depend on geographic location and other parameters, many of which are as yet undetermined. The attenuation values for frequencies up through 6 GHz are representative of those that will not be exceeded 0.01 percent of the time. They assume an integrated value of precipitation along the propagation path of approximately 300 (mm/hr) (km of path length). The values indicated for frequencies of 12 GHz and higher are representative of the attenuations that will not be exceeded 0.01 percent of the time if space diversity (s.d.) is employed. They assume that there will be a usable diversity path that will not experience greater than an integrated value of precipitation of approximately 60 (mm/hr) (km of path length). This space diversity could be achieved either by redundant earth terminals (e.g., separated, say, by 10 km) or by switching to a satellite relay that offers a suitably different Table I

RELATIVE UTILITY OF DOWN-LINK FREQUENCIES

(6)	Ds 56dB (m)	60	30	15	10	5	ŝ	1.5	.67
(8)	W ₁₀ (MHz)	T	I	I	I	I	3000	25	.125
(2)	We (MHz)	2500	2000	1500	625	250	30	.25	.00125
(9)	A ₁ 2 (mxm)	40 × .25	20 × .5	10 × 1	6.7 × 1.5	3.3 × 3	2 × 2	1×1	.45 × .45
(2)	A _e /GHz (m ²)	4	ŝ	6.7	16	40	134	4000	1.6×10 ⁵
(4)	System Temp. (oK)	290	290	290	290	580	580	580	1740
(3)	Attenuation (dB)	0	0	0	3	3 s.d.	7 s.d.	20 s.d.	30 s.d.
(2)	P s (kw)	5.0	4.0	3.0	2.5	2.0	1.5	1.0	.75
(1)	Frequency (GHz)	1	2	4	9	12	20	40	06

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propagation path. Although there is considerable uncertainty and variation with location for the attenuation that might be experienced, this will not alter significantly the conclusions which will be drawn with respect to the relative utility of the various frequencies for satellite down links.

The earth station system temperatures of Column (4) are typical of those that might be achieved easily, reliably, and cheaply for any environment of significant interest. The area, A_e , of Column (5) is the effective earth antenna aperture area in square meters required to obtain a carrier-to-thermal noise ratio referred to the input of the receiver of 20 dB when the satellite radiated power covers a solid angle equal to 1/4 of that intercepted by the earth, and a frequency bandwidth of 1 GHz.

Column (6) gives the dimensions of the earth antenna, $A_{\frac{1}{2}}$, that might be appropriate for a fixed, linear adaptive array that could operate with $1/2^{\circ}$ longitudinal spacing of the satellites. The dimension orthogonal to that of adaptation is limited to the adaptive dimension at the higher frequencies and to a value that provides 10 m² for the lower frequencies. All of these antennas would be of comparable complexity and systems performance, and they would contribute only a minor portion of the systems cost for trunk message service.

The relative down-link circuit capacity per dollar of system cost is then indicated by the figure-of-merit bandwidths, W_e, in Column (7) that could be supported with a coverage of one-quarter of the projected earth and the other parameter values that have been assumed. The values in Column (7) are the best indication of relative utility of the various down-link frequencies if the satellite power must be used to reach a large number of earth terminals dispersed or distributed over a large fraction of the earth's surface. It is clear that the lower frequencies have much greater potential and that the utility rapidly degrades above 12 GHz to the point that new concepts of utilization must be developed to justify consideration of frequencies of 40 GHz and above for satellite-to-earth down links. Even if some kind of service is considered that involves only a very limited number of fixed earth points the situation is not greatly relieved. For example, if only ten high-gain

(56-dB) beams are used to link ten earth points, the bandwidths, W10' in Column (8) that could be supported are only 100 times those for 1/4earth coverage, and are still relatively unattractive at 40 GHz and higher frequencies. (The satellite antenna diameters, Dg, to provide 56-dB gain with a uniformly illuminated array are indicated in Column (9).) As another example, if the higher frequencies were used for satellite links to high-altitude aircraft, it would probably be desirable to provide 1/4 earth coverage, and the attenuation factors of Column (3) would no longer apply. However, multiplying the values in Column (7) by a factor to compensate for the attenuation still provides relatively unimpressive capabilities at 40 GHz and above. Furthermore, the apertures of Column (6) for the earth antennas could no longer be adaptive arrays in one dimension but would require electronic pointing or adaption in two dimensions and may be beyond feasibility for an aperture with the indicated large number of adaptive elements subject to rapid changes in orientation.

The conclusions that may be derived from Table I about the relative utility of down-link frequencies are the following. During the period when operational satellite power supplies are limited to capabilities of 10 to 20 kw, the down link provides the most limiting constraint on systems performance for most applications. The achievable performance degrades so rapidly with frequency above 10 GHz that every effort should be made to first exploit fully the potential frequency bands below 10 GHz for satellite down links before considering the higher frequencies from which there will be a rapidly diminishing cost benefit with increasing frequency. The figure-of-merit bandwidth obtained in Table I for 1 GHz exceeds the available bandwidth even when the values are halved by splitting the bandwidth between two orthogonal polarizations. Thus these lower UHF frequencies are best exploited from a down-link power standpoint for applications with smaller apertures and higher systems temperatures such as the mobile and direct broadcast services previously discussed for UHF satellites.

The full exploitation of the spectrum will in most cases involve sharing frequency use with the same and other services. For this purpose principal consideration will be given at this time only to those portions of the spectrum potentially suitable for satellite links that have previously been allocated ⁽⁴⁾ to fixed, mobile or communicationsatellite services. Questions of appropriate partition of the spectrum between the communications services and other services such as radar radio location with which compatible sharing may not be feasible will not be addressed. The possibilities for sharing spectrum between satellite and terrestrial microwave relays has been covered elsewhere.⁽¹⁾ Therefore only a summary of some of the more important features will be repeated here, together with an interpretation of an attractive way of evolving the use of the spectrum from previous allocation and use.

It would seem appropriate that all the potential frequency bands for satellite communication service in the prime lower portions of the microwave spectrum should be adapted toward intense sharing with satellite down links. This would mean evolving terrestrial services into configurations that do not have antennas looking toward synchronous orbits, or that have isotropic or smaller response characteristics in the directions of synchronous orbits. It would probably also be desirable to shift most mobile communication services to the lower UHF previously discussed for these applications. In addition, the prime portion of the microwave spectrum should be planned to develop into complete twoindependent-polarization down-link usage. The complete down-link usage can be obtained either by two-way (reversing of up and down bands) usage if both up and down links are in the prime portion of the spectrum, or even better by placing the up links at much higher frequencies that are not so suitable for down links. In order to insure the compatible intense sharing of the spectrum between the terrestrial and satellite services, the satellite systems will need to evolve toward increased satellite apertures and EIRP's, and increased bandwidth expansion, which are the directions of change indicated anyway for increasing total circuit capacity and for decreasing the system cost per circuit.

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ALLOCATIONS FOR SPACE SERVICES ABOVE 450 MHz

The suggestive illustrations of allocations that are indicated here include only those for general space services above 450 MHz for communication or data relay and broadcasting purposes. They do not include (or specifically accommodate) special space service requirements for meteorological aids or satellites, space research, earth science satellite services or radio astronomy. In all cases, the suggested allocations are assumed to be *shared* with other existing or projected services⁽⁴⁾ which for simplicity have not been indicated. However, this is not meant to depreciate in any way the other services that might share the allocations.

It is strongly recommended that allocations be adopted as soon as feasible to make adequate spectrum permissibly available for planning and coordination for many attractive space services. The allocations suggested below are not meant to divest any other usage even though they may attract changes to space services. The amount of spectrum allocated is felt to be appropriate in order to limit inefficient investment, and to give adequate opportunity for growth and development of attractive future space services.

450	-	710 MHz	SPACE	(Synchronous Satellite toward Earth) ^a
710	-	960 MHz	SPACE	(Synchronous Satellite toward Earth) ^b
960	-	1215 MHz	Space	(Synchronous Satellite toward Earth) ^c
1400	-	1430 MHz	Space	(Earth to Satellite) ^d
1430	-	1660 MHz	SPACE	(Toward Synchronous Satellite) ^e
			Space	(Synchronous Satellite toward Earth) ^f
1700	-	2290 MHz	SPACE	
2450	-	2690 MHz	Spaceh	
3400	-	3700 MHz	Space	(Synchronous Satellite toward Earth) ⁱ
3700	1	4200/MHz	SPACE	(Synchronous Satellite toward Earth) ^J
4400	-	4990 MHz	SPACE ^k	

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5725 - 5925 MHz	Space
5925 - 6425 MHz	SPACE ^m
6425 - 7750 MHz	SPACEn
7750 - 8500 MHz	SPACE
10.7 - 13.25 GHz	SPACEP
14.4 - 15.35 GHz	SPACE ^Q
17.7 - 23 GHz	SPACE ^r
25.25 - 31.3 GHz	SPACE ⁸
36 - 50 GHz	SPACE ^t
50 - 74 GHz	SPACE
74 - 88 GHz	SPACE
88 - GHz	(ω)

"This band is suggested as a primary allocation for mobile (land, maritime, aeronautical, and low-altitude satellite) services from synchronous satellites toward earth. The suggested radiated power limitations for this service are: an EIRP per independent polarization and satellite of $\frac{42}{\lambda(m)}$ w/4KHz or a flux density at the earth's surface per independent polarization and satellite of $\frac{2.1 \times 10^{-15}}{\lambda (m)} \text{ w/4KHz/m}^2$. The services sharing this allocation services sharing this allocation will be protected from a total interference from this service as received on an isotropic antenna at the earth's surface not exceeding the effect of 2000°K of thermal noise. This service will be protected by a minimum synchronous satellite spacing (with the above maximum EIRP on a given polarization and directed toward the same earth location) of 45 $\lambda(m)$ degrees of longitude. The wavelength in m, λ , is the longest wavelength radiated by both adjacent satellites at maximum flux density at the same earth location, and the above spacing will permit isolation of each satellite with adaptive earth arrays of 1-m minimum dimension in a direction parallel to that of the satellite spacing. It is suggested that this band be used on two independent polarizations so as to double the effective usable spectrum. The up-link frequency bands for this service are suggested for 1400 to 1660 MHz.

^DThis band is suggested as a primary allocation for mobile and broadcast services from synchronous satellites toward earth. The same radiated power limits, protection to shared services, satellite spacings and minimum earth aperture dimensions, and use of two independent polarizations as indicated in (α) also apply here. The up-link frequency bands for this service are suggested for 1710 to 1960 MHz.

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^CThis band is suggested as a secondary allocation for space services to broadcast and austere terminals and would become a primary allocation when the currently allocated aeronautical radionavigation services have been replaced by more suitable ones. In addition to protecting the primary allocation in this band, a minimum synchronous satellite spacing of 11 λ (m) degrees of longitude is suggested. This will permit the use of four times as many satellites with adaptive earth arrays of 4-m minimum dimension in a direction parallel to that of the satellite spacing. The area of the earth antenna need not be larger than 1 m², however, if its dimensions were 4 m × 1/4 m. The up-link frequency bands for this service are suggested for 2035 to 2290 MHz.

^aThis band is suggested as a secondary allocation for an up link to synchronous satellites from surface-based earth stations. By using large receiving apertures in the satellites, only modest transmitting powers are required from the earth. The system design involving location, antenna characteristics, and power spectrum can, then, easily be achieved to give full protection to the primary service of radio astronomy, and not serve to limit the satellite spacing required for isolation of the down links.

^eThis band is suggested as a primary allocation for the up-link mobile and low-altitude satellite services to synchronous satellites. The power requirements will be determined by the flux densities expected at synchronous orbit from other services sharing the allocation. Therefore it would be desirable to limit the EIRP in the direction of synchronous orbits from other services to the lowest that is feasible for their applications. The transmitting antenna dimensions for this application should be large enough not to limit the satellite spacing as determined by the down links.

 J This band is suggested as a secondary allocation for a satelliteto-earth link that might be used with the same systems and in the same way as discussed under (c). The up-link frequency bands for this service are suggested for 2460 to 2690 MHz.

^gThis band is suggested as a primary allocation for both up and down links between earth stations and synchronous satellites. The uplink usage would be associated with down links at lower frequencies which have already been discussed. The down-link usage is suggested to be associated with up-link bands at 4400 to 4990 MHz, and could provide valuable trunk message services to relatively small fixed terminals. For example, 10 m² of aperture with dimensions of 20 m \times 0.5 m used as a linear adaptive array would permit simultaneous independent communications with all the satellites within view as long as they are spaced at least $1/2^{\circ}$ apart in longitude. This band could be used on two independent polarizations so as to double the effective usable spectrum.

^hThis band is suggested as a secondary allocation for the up bands associated with the down links discussed in (f), and as the down link associated with a suggested up-link frequency band from 4400 to 4640 MHz. The latter service would be secondary to that discussed in (g) so that it would not limit the satellite spacings as determined by the up links. i This band is suggested as a secondary allocation for down links because it shares the allocation with an incompatible primary service of radiolocation in some parts of the world. The suggested up links for association with this service are in the frequency range 4690 to 4990 MHz. Again the up-link service in the bands suggested would be secondary to the service discussed in (g) so that it would not limit the satellite spacings as determined by the up links.

^JThis band is suggested as a primary allocation for down links from synchronous satellites toward earth. This is the established use associated with up links in the bands 5925 to 6425 MHz. The current international specifications on the use of this band are temporarily satisfactory; however, it is suggested that the terrestrial usage should be encouraged to design systems to avoid pointing the receiving antennas with greater than 10 dB of antenna gain (preferably with an average of less than isotropic gain) toward synchronous orbits. This would permit high capacity, higher flux power density space use with small inexpensive earth antennas, e.g., 10 m^2 of earth aperture with dimensions of $10 \text{ m} \times 1 \text{ m}$ used as a linear adaptive array would permit simultaneous independent communications with all the satellites within view as long as they are spaced at least $1/2^\circ$ apart in longitude. This band could be used on two independent polarizations in such a way as to double the effective usable spectrum.

 $k_{\text{This band is suggested as a primary allocation for the up links}$ previously discussed in (g) and for down links for large capacity trunk message types of service. The suggested bands for up links in the latter service are from 10.7 - 11.29 GHz. Similar specifications to those suggested in (j) are also applicable for the down-link use of this band.

²This band is suggested as a secondary allocation because it would be shared by an incompatible primary radio-location service in much of the world. It might be used for up links associated with down links at lower frequencies, or it could be used for down links associated with up links at suitable frequencies above 10 GHz.

^mThis band is suggested as a primary allocation for the up links to be used with the established down-link service discussed in (j). In addition it could be used for down links associated with up-link bands from 11.425 to 13.25 GHz which would also serve the down links discussed in (n). Similar specifications to those suggested in (j) are also applicable to the down-link use of this band.

ⁿThis band is suggested as a primary allocation for down links from synchronous satellites toward earth. Part of this band has been associated in established usage with up links in the frequency range from 7900 to 8400 MHz. However, it is suggested that these down links might be associated with up-link bands from 11.425 to 13.25 GHz, which could also serve the down links discussed in (m). Similar specifications to those suggested in (j) are also applicable to the down-link use of this band.

^OThis band is suggested as a primary allocation for up links in established association with down links discussed in (*n*), and for down links associated with up links in bands from 14.4 to 15.15 GHz. Similar specifications to those suggested in (*j*) are also applicable to the down-link use of this band.

^PThis band is suggested as a primary allocation for up links associated with down links at lower frequencies previously discussed, and for down links associated with up links in the bands from 17.7 to 20.25 GHz. Similar specifications to those previously discussed are suggested for the shared use of this band.

qThis band is suggested as a primary allocation for similar use to that discussed in (p). Its down-link use is suggested for association with up links in the bands from 20.4 to 21.35 GHz.

ⁿThis band is suggested as a primary allocation for similar use to that discussed in (p). Its down-link use is suggested for association with up links in the bands from 25.7 to 31 GHz.

⁸This band is suggested as a primary allocation for similar use to that discussed in (p). Its down-link use is suggested for association with up links in the bands from 36 to 42.05 GHz.

^tThis band is suggested as a primary allocation for similar use to that discussed in (s). Its down-link use is suggested for association with up links in the bands from 74 to 88 GHz.

^UThis band is suggested as a primary allocation for experiment, test, demonstration, and development for all kinds of shared communications, including space services.

^vThis band is suggested as a primary allocation to provide up links discussed in (*t*), and for down links in association with up links at higher frequencies.

^WThese bands above 88 GHz are suggested for experiment, test, demonstration, and development for all kinds of shared communications services, including radio astronomy. SYSTEMS DESIGN AND COORDINATION FOR THE DEVELOPMENT OF UHF SATELLITES The systems design and coordination for the development of UHF satellites is a multifaceted task involving such diverse activities as the coordination of frequency use, the study of satellite deployment, and various antenna developments. Furthermore, much of this effort should await permissive frequency allocation before the investigations of many details would be justified. Also, the hardware and antenna developments would depend on the coordination of frequency use and the satellite deployments. However, the suggested antenna developments will have attractive applications for other purposes and at other frequencies which will justify immediate initiation of development activity on the antennas. It will, of course, also be necessary to develop the remainder of the satellite and earth station equipment, but this should be relatively straightforward once the antenna systems have been established.

It is beyond the scope of this paper to delineate in detail the total effort that is needed. Only a taste of what will be required in each of the three general areas indicated above will be outlined. If a vigorous development effort is applied it should be possible to begin operation of some of the services discussed by 1975.

Coordination of Frequency Use

The coordination of frequencies, bandwidths, and modulations for efficient compatible global use for civil and military, domestic and international, aeronautical, maritime and land mobile, navigation and communication services is important for the conservation of the spectrum and for the efficient use of radio equipment. For example, if every aircraft service (civil, military, and independent nationality) makes independent use of the spectrum for communication and navigation purposes, not only does it squander spectrum but every aircraft that might need to use independent facilities must carry a separate set of electronic equipment that is compatible with these facilities. This is an unnecessary, inefficient, and unreliable burden that should be avoided at all costs. However, in view of the many completely independent developments that are in progress, a formidable coordination effort will be required to minimize the cost of accommodating to a system of common

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compatibility. In conjunction with general navigation services, there is a variety of associated services that need to be coordinated such as collision avoidance, altimetry, and terminal guidance.

The spectrum also needs to be partitioned appropriately to accommodate the future growth needs of the various mobile services. The needs for land and maritime mobile services tend to be geometrically exclusive and therefore may offer the opportunity to share common frequency bands. However, most land mobile needs are short range that are easily satisfied with only a retrodirective mode of switching in the satellite. On the other hand, many important maritime and aeronautical service needs are long range to central control stations, and require an additional, more complicated switching mode in the satellite. It would be desirable to group and partition off these circuit frequencies to simplify the satellite technology. Also an appropriate partition of the spectrum will be necessary in the design for the efficient use of the satellite amplifiers and antennas over the large frequency bandwidth that would be spanned and for the evolutionary development of the use to full operational capacity.

The bandwidths and modulations used for communications also need coordination when they may be used globally with facilities under many different jurisdictions. Digital modulations are attractive for applications needing privacy, security or special data transfer capabilities. The bandwidth and modulation characteristics of the monitoring and broadcast response circuits should be designed to accommodate the projected growth in numbers capacity and information bandwidth for future service needs.

Satellite Deployment

The satellite deployment that will efficiently satisfy the developing global needs must be investigated so that appropriate selections can be made from the alternatives for various services to the various parts of the world. The longitudinal locations and minimal orbital inclinations that satisfy the global coverage and navigational accuracy requirements need to be established. Also, the geometric factors involved in satellite antenna beam coverage, spacing, interchangeability between satellites, and usage for reserve capacity need to be investigated.

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Antenna Developments

The array-lens antenna systems for the satellites are especially important for achieving the desired versatility and cost benefit from the satellite relays. Some of the factors of greatest concern are the frequencies, bandwidths, directivities, gains, and switching versatility desired for the various services. For many applications the highest feasible gain with acceptable aberration, polarization isolation, beam overlap, and sidelobe problems will be one development objective. Important tradeoffs need to be investigated between focal lengths, illumination functions, off-axis angles, gains, and aberrations. Preliminary investigations indicate little difficulty in achieving 50-dB gains, but that aberrations will tend to limit the achievable gains to less than 60 dB for flat surfaces, uniform illumination, and physically acceptable focal lengths. The array-lens antennas should also have attractive applications at frequencies higher than UHF.

The 1-m-diameter adaptive array is another development that is particularly important for mobile terminals. Its design must obtain the bandwidth and directional coverage, polarization response, gain and interference rejection and speed of adaption that are needed for mobile service. The system must be designed to provide suitable efficient cooperative signal coding for the desired adaptive performance.

Linear adaptive arrays for versatile efficient use with earth stations requiring simultaneous independent contact with a number of different satellite relays is another antenna development that will be needed, particularly for improved cost performance of future fixed earth stations.

POLICIES AND THE ORGANIZATION AND OPERATION OF UHF SATELLITES

There are many outstanding policy issues with respect to organization and operation that need to be resolved before vigorous fruitful development of the potential of UHF satellites can be realized for mobile, broadcast, and austere terminal services (both domestic and international). Who should operate them? What about competition, monopoly, and regulation? How should the cost of cooperate operational entry be handled? How could freedom and right of access with fair but meaningful cost be insured?

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The satellite technology that will become available offers the opportunity to employ radically different approaches to many of these problems and will make possible new types of services for consideration. Some of these approaches and possibilities will be described here. They could have an even greater impact on--and provide greater thrust to--the development of beneficial communication services than the exciting technological potential that awaits exploitation. However, the progress will be slow without early permissive frequency allocations and conceptual acceptance that will allow vigorous development. Also, acceptable transition plans must be devised that facilitate graceful entry into the new operations without seriously penalizing either the producers or the consumers of the traditional or established services.

Let us first illustrate some of the possibilities with broadcast. The technology would permit including a narrow bandwidth response from every receiver through satellite relay to a local central computer that could automatically identify every receiver that is "on" with the channel to which it is tuned. Only 0.1 percent of the television bandwidth would be needed for sampling one million receivers every minute for complete identification, channel tuning, and yes-no type of response to a few questions. The computer could provide a live numbers total for rebroadcast, program analysis, advertising reach, polling assessment or audience reaction in addition to recording for automatic individual billing for pay TV programs. This service could be provided without greatly increasing the receiving customer costs. Satellite broadcast would offer an excellent opportunity for separation of programming and transmission in broadcasting. If the government provided and regulated the satellite transmission medium and sold the service time to interested program producers, regulation and control could be made a simple unobtrusive procedure with unparalleled independent freedom for programming and transmission. Under government specification contracts could be let to successful bidders to solicit subscribers and to install and service receiving antenna-converter-responders. Similarly the other hardware items such as the earth stations for transmitting programs up to the satellite and for receiving and processing the responding data could be contracted for so as to give all industry equal opportunity to produce and to profit from the hardware and its servicing. The programming, then, could be completely separated from the transmission, and any producer of programs (network, local, industry, government, or individual) could bid for channel time and receiver response information.

The rate structure for transmission time could be arranged to yield a minimum return adequate to pay for the costs of satellite relay broadcasting at considerably lower cost than for conventional terrestrial broadcasting. The rates could be varied with time of day so as to obtain the greatest fill and revenue possible with a given total satellite capacity, which could in turn be increased as needed to keep the costs lower than for conventional terrestrial broadcast. Thus it would be possible to subsidize directly the transmission of educational or public information programs rather than to expect commercial networks or other program producers to carry such programs. Legislators could be given "franking privileges" to expose issues to constituents and to obtain an immediate polled response. The FCC, Congress or other leaders could be given the opportunity to poll the public to determine the attitudes about various programs and to expose bad taste in programming.

It should be possible to extend this programming freedom to include pay television, so that eventually there would need to be very little program constraint on any TV operation. Movies could be broadcast by producers, local theaters, independent program developers, or anyone who

obtains the program rights. They could charge whatever price they wished for first run, rerun, etc. They could include advertising if they wished and market the programs in any way desired. TV would serve as theater, arena, or stadium extension so as not to constrain the program to any specific staging or audience limitations. The viewers would also have greater freedom of choice and could influence the programming. If they paid for programs in, say, one minute increments, any program that becomes dull or includes too much advertising could easily be turned off without further cost. The viewing cost could be made to vary throughout the program depending on likely viewing interest, e.g., between periods in a sports event or at intermissions, advertising might be carried free to the viewer. Of course this type of operation may change the nature of some types of programs, e.g., sports contests, such as prize fights, might emphasize entertainment more than contest in order to maintain a longer interest time for greater revenue. For pay TV it would probably be desirable to include a meter at every receiver to provide the viewer with a running total of the charges accumulated and the cost rate of the program in progress.

The total TV channel capacity could be built up incrementally to accommodate the foreseeable demand. The frequency band from 710 to 960 MHz could provide up to ten channels at any location at two channels per satellite per location to 1-m-diameter antennas. This might be an adequate number of channels for mobile users with further expansion in numbers of channels designed for fixed home use. In the latter case 1 m^2 of antenna aperture in the form of a linear array, $4 \text{ m} \times \frac{1}{4} \text{ m}$, would permit 50 channels in the spectrum 960 to 1215 MHz at any location. These channels could be built up by two-channel increments at any location so as not to require large initial unused capacities while developing their use. In any satellite operations of the type here discussed, and especially if a particular network or program is not always identified with the same channel, it would probably be desirable to maintain one specific channel to provide continuous news and information about programs, schedules and channels.

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With operations of the type described above, TV channels could be obtained for any kind of service including private use. Costs would be especially low during off hours, which might attract a variety of special uses. The costs and performance of satellite TV broadcast should prove better than terrestrial broadcast or CATV operations. Better quality signals should be possible with the large bandwidth expansion that could eliminate the ghosting of multipath propagation or reflections in long cable systems. Everyone might be reached with satellite broadcast systems at lower consumer costs than for CATV, especially in remote or low density areas. Also the number of channels and types of service possible would be unmatched by other broadcast techniques. This includes their availability to mobile users. Furthermore, it would be possible to subscribe to the service more easily than for CATV. No subscriber would need to be penalized by when he signed up or by his location and no special right-of-ways or easements would be required except in large multiunit buildings.

The question does arise as to the growth potential of satellite relays as limited by available spectrum, and the relative roles which satellite relays and the "wired city" might ultimately play. If it is assumed that all fixed locations including homes could employ at least one square meter of antenna area in the form of a linear adaptive array, 4 m $\times \frac{1}{4}$ m, the total orbital relay information capacity available for down links in the 590 MHz between 1700 and 2290 MHz would be about 4.3 times that for the band 960 to 1215 MHz. As a further illustration, in the 3500 MHz at 10.7 - 13.25 GHz and 14.4 - 15.35 GHz there would be more than 150 times the capacity of the band 960 to 1215 MHz. In each case these would be the relative capacities at any earth location. For the higher frequencies larger satellite antenna gains might be feasible sooner so that smaller earth areas could be isolated for independent reuse of the spectrum. Thus a spectrum equivalent to 7500 TV channels at 50 MHz per channel could conceivably be provided independently to each 100 km radius of area at the earth's surface from the 3500 MHz considered above 10 GHz. If compressed video communications of 1 MHz information bandwidth (using 12 MHz of radio spectrum) were considered

and if an average of 30 subscribers for this type of service could be accommodated per channel, a total capacity of about 1 million subscribers in every area of 100 km radius at the earth's surface would be the maximum that might ultimately be approached using satellite relays in this portion of the spectrum.

Such capacities might not be adequate for video communications in high population density areas of the future, and ground distribution networks (e.g., cable or 60 GHz microwave relay) may be necessary and desirable *in addition to* satellite broadcast and mobile communications. The satellite relay capabilities will be needed to supply the communications facility growth necessary to avoid stunting the development of vehicular use and of the less densely populated areas of the earth.

The operational entry into satellite broadcasting may be one of the most formidable obstacles to overcome, and it might be a long time before this could be accomplished without government support. A feasible schedule for establishing entry might be as follows: vigorous development and test of all systems components to enable commencing operations by 1975; then concurrent broadcast from satellites and terrestrial stations with the same programs until 1980 at no or nominal additional cost to the broadcasters, while the public is given the opportunity to obtain converters, etc.; and finally, by 1980 the broadcasters could be permitted to phase out their terrestrial broadcasting as they commenced paying for broadcast and response services from satellites. In order to permit an orderly changeover of public receivers without unnecessary hardship or denial to the public, a reasonable period of overlapping services would seem to be necessary with some government subsidy. However, the same broadcasting service rates should be made available to everyone during this period, which will tend to promote entry of new programs and services, especially during this subsidy period.

The operation of the UHF satellites for mobile and austere terminal communications services might have many similarities to the broadcast operations already discussed. A way must be provided for a central station to keep track of user identity and time and type of use of the

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satellite relay services. This might be accomplished by means of separate control channels that identify use in, say, one-minute intervals in much the same way as for the TV reception previously discussed. In fact, much of the TV monitoring system might be used in common at the mobile or austere terminals and at the central monitoring and billing location to monitor the use of private intercommunications or private access to the local telephone systems. This service could be provided to individuals or to the local telephone systems in a way that might ultimately be indistinguishable in principle from the pay TV operations.

Since all these types of services could have access to overlapping portions of the spectrum, the relative demands for the various types of service and the prices that they could justify for spectrum usage could quite naturally adapt the spectrum usage to its greatest public benefit. This could implicitly provide a spectrum and orbit use payment, or be adapted to explicit assessments for this use at any or every level of government. Thus the UHF satellites could serve as a testing ground for a more effective economic basis than currently exists for assigning rights to the use of the valuable spectrum and orbit resources.

Some of the most difficult policy problems in the organization and operation of telecommunication services are connected with their regulation. The traditional method of legal action to regulate monopolies or limit trust operations is difficult to administrate in a way that offers the appropriate incentive for the development and use of equipment and services most beneficial to the public. In the case of monopolies it does not adequately discourage investments in, and continued operation of, systems that are obsolete in possible performance. A new approach that could be tried with the UHF satellites would be to inject economic competition in portions of the operating telecommunications industry by entering the competition directly with government-supplied service. If the rates for the government-supplied services are then regulated to insure that the revenue returns from the competing portions of the government services exceed their costs by, say, at least 10 percent, unfair government competition could be avoided. The absence of a direct limitation on possible profits of the industry should

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provide the incentive to develop new and more cost-beneficial services with large profit potential. In this type of operation the economic regulation would be applied to the government services to prevent "unfair competition," and industry could be unshackeled from direct economic regulation.

If the above approach is to be successful it may be of help to separate such operations as manufacturing and local services from long-line and overseas operations. Also it may be necessary to subsidize investment commitments of the past in order to limit losses from undepreciated equipment offering uncompetitive services. In addition, because of the large investments required to gain entry into this field and provide competition, it may be desirable to limit rate changes permissible for any operating service to something like 10 percent per year. If any outsider then conceives of a new idea for an attractive service or a cost saving, or if the established services are being provided at excessive rates, a new entry would be possible with enough time of limited competition to establish a foothold. With the aid of such measures as the above it may be possible with UHF satellites to provide beneficial competitive stimulation for long-line and undersea cable services, for international and domestic satellite services, and for local, mobile and broadcast services.

A variety of justifications have been developed for government operation of the proposed UHF satellites. These have been concerned with new approaches to regulation, the requirements for monitoring the specifications of new service possibilities and the problems of entry into a new type of service that would replace traditional services without imposing unacceptable hardships on participants of the established services. In addition, it is a recognized government objective to foster to the extent of at least some subsidization the development and provision of especially beneficial communication services for the underprivileged or developing regions of the world, both domestic and international. Most of these services could be provided with UHF satellites, and if they are to be subsidized, this could most easily be administered under government operation. Furthermore, these services might most efficiently be supplied by the same UHF satellites that could provide global navigation and communications services for international aircraft, ships, and vehicles of all types.

The many justifications for government operation of the proposed UHF satellites suggest that the government should take the initiative to obtain early permissive frequency allocations and conceptual acceptance, and to vigorously pursue the development of the UHF satellites. Also, planning should be initiated for operating the UHF satellite systems and monitoring and supervising the use of the spectrum involved after successful development.

REFERENCES

- Hult, J. L., et al., The Technology Potentials for Satellite Spacing and Frequency Sharing, The RAND Corporation, RM-5785-NASA, October 1968.
- Spectrum Engineering--The Key to Progress, a report of the Joint Technical Advisory Committee of the IEEE and EIA, March 1968.
- 3. Hult, J. L., Satellites and Future Communications, Including Broadcast, The RAND Corporation, P-3744, April 1967.
- 4. Excerpts from the Final Acts of the Extraordinary Administrative Radio Conference to Allocate Frequency Bands for Space Radio Communication Purposes (including Article 5 of the Radio Regulations, Geneva, 1959, as amended by Space EARC, Geneva, 1963).





July 1, 1969

Isporter

" voctellet.

TO: Jon Rose

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FROM: Tom Whitehead

This is the area I referred to in which legal problems abound that you might want to get involved in. Don Baker from Justice will be working on it with me, but primarily from the aspect of the feasibility of viable competition. The legal problems I have in mind relate to finding a device whereby ownership and risk are retained in the private sector while no right to continue operation is implied after the end of a trial period.

cc: Mr. Whitehead

CTWhitehead:ed

July 1. 1969

MEMORANDUM FOR MR. FLANIGAN

Attached is a memorandum on the domestic communications satellite issue and a proposed memorandum for you to send to Chairman Hyde. The Hyde memo is necessary to get him off the book in postponing Commission action on their draft order.

I have the necessary people identified and have two people detailed to me to work on this issue. I think we can come up with a very credible and impressive counterproposal.

Hyde is aware in a general way of my reservations and I would propose to use a variation of the attached memorandum as a talking paper for the group to get started with. It is not clear whether we will evolve a joint position that the Commission can incorporate as an order, or whether our output will take the form of a formal letter to the FCC; we will just have to wait and see how things work out.

If you have no objection, I propose to call the first formal meeting of this group for next Menday and to allow Hyde to make public the contents of the memorandum you cent to him.

> Clay T. Whitehead Staff Assistant

Attachments Mr. Flanigan cc: Mr. Hofgren Mr. Trent Mr. Rose Mr. Whitehead Central Files

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THE WHITE HOUSE

WASHINGTON

July 1, 1969

MEMORANDUM FOR MR. FLANIGAN

The Federal Communications Commission has drafted a proposed Order outlining interim policies regarding the establishment and operation of communications satellite systems for domestic services. Briefly, this Order would:

- Authorize a single multi-purpose system to incorporate standard voice services, television distribution, and certain specialized data services.
 - Establish an Advisory Committee to the Commission, consisting of the major competitors for commoncarrier and specialized satellite systems, for the purpose of developing a plan for the technical and operational design of the pilot system.
- Designate Comsat as Planning Coordinator for the development of this plan.
- Defer all decisions on potential ownership of pilot or operational systems, or segments thereof, until the technical design and operational plans are submitted to and approved by the Commission.

I believe we should oppose the Commission's approach to this issue, and seek an interim policy position on domestic satellites which is more definitive and which promotes greater innovation and flexibility on the part of the private sector. There are two basic reasons for doing so at this time. First, there are a number of basic objections to the Commission proposal when it is examined in the context of U. S. communications generally. Second, this is probably the only major decision for some time that gives us the leverage necessary to promote a re-examination of the need for extensive common carrier regulation of all U. S. communications by the FCC and to stimulate a more vigorous and innovative competition in the communications industry.

Background

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The United States presently enjoys the most sophisticated, effective network of communications facilities and services of any nation, both common carrier and private. Because of our highly developed terrestrial systems, the role of communication satellites (or any new technology) in providing U. S. domestic services is both less striking and less easily discerned than is the case in other countries where satellites offer clear economic benefits.

Nevertheless, there is ample evidence that satellite technology could find many economic applications in the U. S. Specific proposals and cost analyses show cost or service advantages for some specialized services such as distribution of TV programs to local broadcast stations, communication with and between ocean vessels and high-speed aircraft, and meteorological data collection and exchange. Satellites may also enjoy a slight cost advantage for long distance carriage of "bulk" message and data traffic, though this is less certain at this time. Due to these generally favorable prospects, several major corporations (AT&T, Comsat, ABC, GE) as well as public-interest groups (Ford Foundation) have indicated a willingness to undertake the risk of establishing domestic satellite systems for various specialized or multipurpose services.

Despite this interest and promise, incorporation of communication satellites into the highly-developed U. S. communications industry faces two serious impediments. First, wherever satellites appear competitive with existing terrestrial technologies, they pose a major uncertainty for regulated common carriers and threaten to weaken both existing and future rate bases. Second, FCC and Congressional policies make artificial distinctions between satellite and terrestrial technologies with respect to both ownership rights and public-interest objectives, and this raises both administrative and economic barriers to potential investors and users.

Evaluation of the FCC Approach

The FCC approach to this policy problem has the following problems:

- It would effectively lock the U. S. for the foreseeable future into a multi-purpose operation typical of common-carrier systems and would therefore impede the development and application of satellite technology for the specialized services for which it appears most promising in domestic U. S. communications.
- (2) While the FCC cites the need to learn more about satellite technology and economics in domestic communications applications, the proposed Order precludes learning anything very significant by foreclosing the very kinds of systems we know least about and yet appear to offer the most potential.
- (3) It precludes the industry from active exploration of the interplay of economics, technology, and operations which would stimulate active development of the potential for new uses and new services, by insisting on finding a way to accommodate the new technology to existing uses and operations and by forcing design of the system before the industry knows how ownership rights are to be established.
- (4) It promises a "least common denominator" compromise solution by, in effect, requiring consensus among a consortium of mutually hostile interests, thereby extending to the domestic scene the demonstrated faults this approach has produced internationally.
- (5) Finally, it places the burden of risk almost completely in the public sector rather than the private where it is appropriate, by insulating existing common carriers from "unfair competition" and by assuring adequate rate of return for the satellite system.

Action

We should inform the FCC that the Administration considers this an important policy issue and expects to have something to say on the matter in a short period of time. We should immediately establish a working group with representation from DTM, CEA, Justice, and Commerce (with the FCC as an observer or member at their option) to attempt to work out an alternative approach. Our objectives would be to:

- foreclose (at least temporarily) the automatic extension of common-carrier regulatory policies to satellite communications until more experience is gained in domestic applications.
- minimize the regulatory impediments to technological and market innovation.
- use this approach as a wedge to encourage a more vigorous and innovative competition among communications organizations.

It is important to recognize that this is probably our last foreseeable opportunity to use a specific decision as a device for challenging the need for regulation as arbitrary and extensive as evolved by the FCC. This particular case is appealing because it goes to the basic principles of regulation and to the heart of the industry structure fostered by the FCC, yet it is not such a large economic issue that existing interests are severely threatened. Finally, there is a very good chance our approach would receive acceptance: the FCC is in a very awkward (and weak) position; we can offer a significant change from the status quo that is not patently adverse to ATT, Comsat, and other major interests; and there is so much uncertainty in the FCC and the industry that a strong Administration proposal would in all likelihood dominate public discussion. Finally, even if we are not able to sell a significantly improved approach, we can go on record in favor of clearly desirable end objectives.

> Clay T. Whitehead Staff Assistant

July 1, 1969

MEMORANDUM FOR

Mr. Rosel Hyde Chairman Federal Communications Commission

Federal policy towards applications of communications satellite technology is a most important issue for which the President and the Federal Communications Commission both have responsibilities. In our review of Federal policies relating to the communications industry, it has become clear that prompt action is desirable. It is also important that our initial policies encourage full exploration of the potential of this new technology and maximum feasible learning about the economics and technological role satellites can play in our already highly developed communications environment.

Toward these ends. I am asking a small group from appropriate agencies to examine this question over the next few weaks. I invite your participation in whatever capacity you deem appropriate. Our purpose will not be to address the merits of various applications and filings before the FCC, but to consider appropriate national policies.

> Peter M. Flanigan Assistant to the President

cc: Mr. Flanigan Mr. Hofgren Mr. Trent Mr. Rose Mr. Whitehead Central Files

CTWhitehead:ed

DOMSAT MEETING - July 10, 1969

Following is a review and analysis of the major issues surfaced and discussed at this meeting.

I. FCC comments on CTW Evaluation of their approach

A. On locking U.S. into multi-purpose system:

Hyde: The FCC approach envisions the possibility of many specialized systems rather than 1 multi-purpose system (cites the possibilities of both multiple satellites and diverse ground station ownership to support this argument). However, a key factor in the Commissions thinking which leads them to reject extensive entry is the question of orbit and spectrum scarcity. It is Hydes impression that relatively few satellite systems can technically be accommodated, at least within present spectrum allocations, and therefore to protect and encourage proponents of new systems and approaches the commission must force the existing entities to adopt a "multiple, independent, but integrated" space segment design. This belief is reinforced by the concept of the space segment as merely an extension of microwave relay range, with little capability or desirability of innovative space segment design approaches.

B. On learning potential of FCC approach

<u>Hyde:</u> Contends FCC <u>would</u> learn from pilot, cites paragraphs 13, 16, and 17 of Draft Order in support. These sections deal primarily with the <u>goals</u> and <u>objectives</u> of a pilot program, not the practical consequences of the FCC approach (But note: it is very important to call attention to the difference between <u>objectives</u> and <u>likely results</u>; the Commission's stated objectives are certainly acceptable.).

C. On interplay of economics, technology and operations

<u>Hyde:</u> Passed over this item lightly, only remarking that it followed from A&B above but since those did not hold water neither did this. Again cites objectives stated in FCC Order, e.g. to try out the techniques suggested by GE and broadcasters.

D. Least Common Denominator

<u>Hyde:</u> This would <u>not</u> occur; FCC would avoid this by making the chairman of the advisory committee a Commissioner, and also by Commission review to see that minority views were included in the system design submitted by the committee.

E. Burden of Risk

<u>Hyde</u>: FCC would <u>not</u> place burden of risk on public users; Commission could refuse to permit inclusion of pilot facilities in

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rate base, although he notes this bridge has not been crossed in preparation of draft Order since no ownership arrangements have been established.

F. Comments on Whitehead Paper

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- <u>Hyde:</u> (1) Seems to contemplate a breakaway from traditional rate-base regulation.
 - (2) Would require considerable legislation to implement such an experiment in non-rate-regulated provision of common carrier services.

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

May 21, 1969

NOTE FOR MR. WHITEHEAD

Mr. O'Connell is out of town, but before leaving he reviewed the attached memorandum in draft and approved it.

In order that you might have this as soon as possible, he asked me to sign it for him, and send it over to you today.

JFL Mialluph

John J. O'Malley, Jr.

Attachment

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

OFFICE OF THE DIRECTOR

May 21, 1969

MEMORANDUM FOR MR. CLAY T. WHITEHEAD

This is in response to your memorandum of May 13, 1969, requesting my advice on the authority of the President to take the initiative in defining the broad characteristics of a domestic communications satellite policy and domestic communications satellite system. You also requested a summary of the "thirty circuit" procurement, including the issues involved, the FCC ruling, and the provision for DTM certification that direct procurement from Comsat is in the national interest.

1. Presidential Authority Regarding Domestic Satellite Service

As your memorandum notes, the Communications Satellite Act (CSA) of 1962 confers substantial authority and responsibility on the President relevant to the provision of domestic communications satellite services. Of course, we all recognize that the state of the communications satellite art has advanced considerably since Congress enacted the Satellite Act in 1962 when it would have been indeed difficult to envision the use of communication satellites for anything other than intercontinental communications services. We would quite agree with Assistant Attorney General Reynquist when he stated in a recent letter to the Legal Adviser of the State Department that Congress could not then foresee the specific organizational form domestic communications by satellite would have in relation to international communications. (See letter from Assistant Attorney General Reynquist to Legal Adviser, Department of State, dated 29 April 1969, pp. 5-6; copy attached.) The Congress did, however, make clear in the Satellite Act the objective of the United States that an international communications satellite system be established expeditiously, and on the basis of an international agreement that would protect the system not only from electromagnetic interference, but also from wasteful duplication of facilities created by competing foreign systems. To these ends, the Act, particularly Section 201(a), authorizes the President, among other things, to insure that arrangements be made for foreign participation in the system and to use this authority to obtain coordinated and efficient use of the electromagnetic spectrum.
The sum and substance of the Assistant Attorney General's opinion is that policy questions regarding a foreign domestic satellite system and the international system are "inextricably related," and for this reason alone no action should be taken approving a foreign domestic system without first determining its impact on the international (or INTELSAT) system. Mr. Reynquist's conclusion is that any United States launch assistance provided for a foreign operational domestic satellite system must have the specific approval of the President. It would certainly seem that if the policy issues regarding a <u>foreign</u> domestic system are significantly related to the international system, those affecting a <u>United States</u> domestic service or system must also be related. Therefore, the specific approval of the President should be required before any separate domestic United States system is authorized.

This is not to say that the Government ought to take the initiative in the technical planning for commercial communications satellite service. The United States domestic and international carriers, including Comsat, rather than the Government should take the initiative in developing the basic technical requirements for a satellite system; but this cannot be done very efficiently in the absence of a policy framework developed by the Government. As the carriers move forward in their planning we would contemplate the Presidential (or Executive Office) function to be to monitor developments carefully, including not only information coming into the State Department from abroad, but also by fairly frequent consultation with Comsat, the United States terrestrial carriers, the Departments of State and Defense, and NASA, to insure that the over-all policy concept set out in Section 102 of the Satellite Act is being followed.^{-/-}

The fact that the President appoints three Comsat directors and is directed by the Act to make an <u>annual report to Congress</u> on the "national program" contemplated in Section 201(a)(1) of the CSA is further evidence of the intent of Congress to provide for a major role for the President in the development of sound communications satellite policy. Of course, the degree to which the Executive Office and the White House participate in the policy process is itself a policy matter, but the United States and Canadian domestic satellite issues seem to us to be of such transcending importance that if the White House role is to be meaningful at all, it must assert itself here.

^{1/} You are undoubtedly aware that Subsection 102(d) states that it is not the intent of Congress to preclude the use of "the communications satellite system for domestic communication services. . . "

As you know, we have continuously opposed the provision of launch service for an independent Canadian domestic satellite. We adhere to that position. It is our view that the White House ought to promulgate the policy that our commitments to INTELSAT as well as the national interest of the United States would best be served if the United States domestic pilot program be serviced through INTELSAT satellites (or, at least, that INTELSAT be offered the opportunity to provide the service). At the same time the FCC should be urged that in order to make most efficient use of the radio spectrum and lower system costs as much as possible that a multiple purpose system, rather than a single purpose system, ought to be authorized.

In summary, the Act does not seem to place any practical limitation on the powers of the President in the provision of policy guidance for the development and operation of commercial communication satellites. However, we would not recommend the issuance of a formal statement of Presidential authority in this area, because it would not result necessarily in the solution of a particular problem, and might lead to a political debate over how the statement should be interpreted, and so forth. This is not to say that upon an appropriate occasion a Presidential statement resolving a specific issue might be very appropriate and helpful-for example, a Presidential statement that the United States will take service for its domestic pilot program from INTELSAT, and will consider at a later time, depending on the circumstances, whether to take service from INTELSAT for any regular domestic system. Such a statement could then be transmitted to all other interested governments with a statement to the effect that launch service will not be provided to any foreign entity for any commercial system outside of INTELSAT.

2. The "Thirty Circuits" Problem

As you may know, this problem arose in 1966 when the Department of Defense decided to contract (subject to the approval of the DTM) <u>directly</u> with the Communications Satellite Corporation (Comsat) for thirty voicegrade satellite circuits between Hawaii and the Far East. The problem has been temporarily resolved after months of negotiating with the FCC, but it may become a serious problem again if NASA decides to contract directly with Comsat for shipboard service for its Apollo program.

The "thirty circuit" procurement became a policy problem because the Satellite Act does not specify who should be authorized to deal directly with Comsat for service. Subsection 102(c) of the Act states the intent of Congress to be "that all authorized users shall have nondiscriminatory access to the system; Subsection 305(a)(2) authorizes Comsat to "furnish, for hire, channels of communication to United States communications common carriers and to other authorized entities, foreign and domestic. . .;" and Section 305(b)(4) authorizes Comsat "to contract with authorized users, including the United States Government, for the services of the communications satellite system. . . . " While the Satellite Act clearly does not limit Comsat's role to that of a "carrier's carrier, " it is silent on precisely how a user would be authorized to deal with Comsat. We maintained from the outset of the "thirty circuits" case, and the Department of Justice agreed, that the United States Government was an authorized user as a matter of law, and that it can contract directly as a matter of right with Comsat for satellite service. Of course, the terrestrial carriers maintained, understandably, that Comsat was intended by Congress to be a "carrier's carrier" and that it could not provide service directly to the Government or the public, except in unique or exceptional circumstances.

Teletypewriter and other record services are provided to the Government and the public over circuits which the record (telegraph) carriers have purchased in the telephone cables from AT&T. In the TAT-4 cable, for example, the record carriers paid \$217,000 for each voice circuit, which they can subdivide into 28 teletypewriter circuits. A practical problem underlying the "thirty circuits" dispute was the deep concern that we shared with the Department of Defense over the excessively high charges that DOD was paying for international private line teletypewriter services, particularly in the Atlantic cable complex. At the rate set by the FCC prior to the "thirty circuits" case, an American carrier could, if it were deriving the maximum of 28 teletypewriter circuits from each voice circuit, receive a rate of \$4,375 per month per circuit and could, therefore, amortize its investment in less than two months.

The "thirty circuit" dispute took place in the context of an FCC proceeding of a much larger scope which the Commission had initiated in June 1965. The proceeding was a formal inquiry, in which the public was invited to submit comments, addressed to whether, or to what extent, the Commission ought to permit entities other than communications common carriers to obtain service directly from Comsat. This office did not interject itself in the proceeding formally, although the General Services Administration (GSA) did state in a filing before the Commission in the fall of 1965 that the Government is in a unique category and can, as a matter of right, contract directly with Comsat for service. Although we felt that while the Government has the legal right to go to Comsat directly for service, the DOD maintained, and we agreed that a requirement exists for both satellite and cable service. It is our view, therefore, that the only permanent solution to this problem would be a merger of all the international communication carriers; but in the meantime, in view of the difficulties involved in the orderly introduction of communication satellite service, there seemed to be an immediate need for the establishment of an Executive Branch policy to guide the Government departments and agencies in the procurement of commercial communications satellite service. In the course of the development of that policy in late 1965 and early 1966, I held a number of meetings with representatives of the interested Government agencies in order to get their views and assistance in developing the substance of that policy. However, the FCC, which had been represented at all of those meetings, sent me a memorandum on April 20, 1966 advising, in effect, that it had its own proceeding going on the general question of authorized use of Comsat services; and that neither Comsat nor the terrestrial carriers could provide service directly to the Government unless the Commission should issue appropriate authorization to do so. While the Commission memorandum, which was signed by the Chief of the FCC Common Carrier Bureau, did not have the status of official Commission policy it clearly implied that despite whatever policy might be established by the Executive Branch for procurement of satellite service for the Government the Commission would adhere to the concept of Comsat as a carrier's carrier and would permit direct procurement by entities other than carriers only in "exceptional and urgent circumstances." Of course, when DOD learned of the way the FCC staff was leaning on this issue it accelerated its negotiations with Comsat, and as a reaction to this the FCC staff moved forward rapidly with the preparation of an opinion in the Authorized User proceeding. The race was on between DCA and the FCC. (For an extended discussion of developments within the Department of Defense, and between DOD and the carriers, see House Report No. 2318, 89th Cong., 1st Sess., "Government Use of Satellite Communications - 43rd Report by the Committee on Government Operations" October 19, 1966, especially Part IV.)

As a result of its negotiations with the carriers, DOD (acting through the Defense Communications Agency) on May 31, 1966 had received bids to furnish the thirty half-circuits from Comsat and from four terrestrial carriers. The bids ranged from \$4,200 per month for Comsat to \$12,500 per month for Hawaiian Telephone Company. On June 1, 1966, DCA entered into a master contract with Comsat, $\frac{2}{}$ and on June 23, 1966 the FCC issued a public notice stating in substance that if the U.S. Government wished to lease commercial satellite circuits it must do so through the terrestrial carriers and deal directly with Comsat only in "unique or exceptional circumstances." Needless to say, this disturbed us a great deal, because it put the Government in no different position than the general public in the procurement of satellite service. I wrote to Chairman Hyde on June 28, 1966 expressing my disappointment in the Notice, and advised him that all the Government agencies, including the Department of Justice, were in agreement on the Government's right to procure satellite service directly from Comsat; that I was concerned about the economic well being of the carriers but that, based upon current charges for cable circuits the Government might possibly save \$6 million over a 3-year period by going directly to Comsat. My letter apparently had no effect on the Commission, which on July 21, 1966 released its formal opinion--just a few days before DCA issued a purchase order to Comsat.

Almost immediately, informal discussions were begun with the Commission looking toward a modification of the Authorized User opinion. The Assistant Attorney General in charge of the Office of Legal Counsel was persuaded to take an active part in the matter; but, despite all our efforts, it became necessary for GSA to file a formal petition for reconsideration with the Commission on August 21, 1966, because the Commission indicated that it would not budge in its refusal to permit Comsat to provide thirty circuits directly to the Department of Defense. Discussions continued during the fall of 1966 until, finally, on January 1967 the Commission agreed to modify its opinion to recognize the unique position of the United States Government.

On February 3, 1967, therefore, the Commission released a memorandum opinion (copy attached) terminating the proceeding and authorizing the terrestrial carriers to provide service to the DOD. DOD had agreed in advance to assign the Comsat contract to the terrestrial carriers as a <u>quid pro quo</u> for the establishment of composite rates which would afford substantial savings to the Government on a global basis. The composite

2/ The contract contained a clause permitting its assignment to the terrestrial carriers if the Government so chose.

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rates were about half way between the satellite rates and the previously existing cable rates. $\frac{3}{}$

We accepted the FCC disposition of the matter as in the best interests of the Government at the time, primarily because it would allow substantial savings to the Government in its procurement of international communication services and also because it recognized that special position of the Government vis-a-vis the direct procurement of services from Comsat.

To be perfectly clear, the revised FCC authorized user decision leaves wide open the question of who--the FCC or the Executive Branch-- has the right to make the final decision as to whether a Government agency can go directly to Comsat in a particular case. However, the revised opinion does recognize not only the responsibility of the DTM in this area, but also that Comsat may be authorized to provide service directly to the Government whenever such direct service is "in the national interest." Thus, the Commission modified the "unique and exceptional" test for direct Government procurement. The present status of the matter is that there is a "gentlemen's agreement" between the Executive Branch and the FCC whereby the Commission has agreed to look to the DTM as the focal point in those cases where a department or agency wishes to procure service directly from Comsat. Before a direct procurement by the Government is permitted the DTM must certify to the Commission that the direct procurement is in the "national interest," but the Commission has not agreed to accept this certification as binding. Thus, it is possible that another "thirty circuits" case can develop.

It seems to us that another confrontation will probably not develop with the FCC if the Executive departments and agencies cooperate with this office in the development of a sensible policy which is coordinated with the FCC at the level of the Chairman. We hope that the Commission will maintain an aggressive policy looking toward progressively lower composite rates. If, however, this should not prove to be the case the Government can either seek to re-assert its rights to go directly to Comsat or expand the services provided in the Government-owned communications satellite system.

3/ In order to keep this matter as simple as possible, I have not referred to the complications which were introduced after DCA decided to assign the Comsat contract to the three record carriers (ITT, WUI, RCAC) and the Hawaiian Telephone Co. on an apportioned basis. Japan refused to permit WUI to provide service there; Thailand would deal only with RCAC; and the Philippine Government expressed the wish to continue to deal directly with Comsat. The matter was finally resolved in May 1968, after lengthy negotiations between DCA, the State Dept., the carriers, and the foreign governments concerned. For your convenience, I have attached copies of the FCC opinions of July 21, 1966 and February 3, 1967; my letters to Chairman Hyde of June 28, 1966 and January 31, 1967; and the letter from Assistant Attorney General Reynquist to the Legal Adviser of the State Department, dated April 29, 1969.

Joh gmally J. D. O'Connell

Attachments

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

OFFICE OF THE DIRECTOR

June 28, 1966

The Honorable Rosel H. Hyde Chairman Federal Communications Commission Washington, D. C. 20554

Dear Mr. Chairman:

I appreciate your taking the time last Tuesday to discuss the matter of Government utilization of communications satellite services. I also appreciate your calling me on Thursday to advise that the Commission would be issuing a Public Notice that day which would state, among other things, that the Communications Satellite Corporation (COMSAT) would be authorized to provide service directly to the Government only in those cases where there are unique or exceptional circumstances warranting the authorization. My staff and I have studied the Public Notice. As you realize, we are disappointed that the Commission contemplates taking a position which would attempt to restrict the right of procurement of communications satellite services by the Government. As I pointed out to you in our meeting on Tuesday, we are of the opinion that Congress gave the Government the right to directly procure communications satellite services from COMSAT.

Based upon our meeting of last Tuesday, I feel that there may be some misunderstanding as to our position in this matter. The main reason I am writing now is to clarify that position to the extent that it may not be completely understood by the Commission.

In the first place, I recognize the Commission's concern that commercial communications satellite service should be implemented in a way which is not unduly disruptive to established communication systems.

We recognize the Commission's right to prescribe the relationship that ought to exist between COMSAT and the carriers. We disagree, however, with the Commission's position that it has the authority, under the Communications Satellite Act of 1962 and/or the Communications Act of 1934, to prescribe the conditions under which the Government can obtain service from COMSAT.

The Honorable Rosel H. Hyde

This subject has been discussed with other departments and agencies
of the Executive Branch, including the Department of Justice. All are
in complete agreement that the Communications Satellite Act of 1962
clearly designates the Federal Government as an authorized user.
I wish to make it clear, however, that the Department of Justice is the
appropriate agency to speak on any legal interpretations involved.

Aside from the question of Congressional intent as expressed in the Communications Satellite Act of 1962, I would like to point out some of the effects which can be foreseen if the Commission should rule to regulate COMSAT's right to provide service to the Government or to affect the Government's authority to deal directly with COMSAT.

A major purpose served by the Communications Satellite Act in granting the Government authority to deal directly with COMSAT will be to expedite the furnishing of service under any conditions, particularly emergencies. In the past, formal procedures and legal restrictions have sometimes created delay and uncertainty concerning the provision of common carrier services to the Government. The Government needs an assured and uncomplicated responsiveness in the provision of all types of communication services if it is to cope adequately with the world requirements of the present day. Unless the provision of communication services can be made adequately responsive to the needs of the Government, it would appear important to review the general question of whether the Government should continue the policy of relying upon the common carrier/regulatory systems for the provision of the bulk of its services.

You know that our policy position has been to utilize the common carriers to the maximum extent possible considering resposiveness, reliability, assurances of service in the shortest possible time, and reasonable comparative costs. We have been working toward the development of an over-all pattern of procedures which would permit both this office and the Commission to seek new and more responsive ways for the common carrier/regulatory systems to meet the needs of the Government. The Commission's Public Notice indicates an entirely different approach to this serious problem. It is my hope that a careful review of Governmental needs in the present day will make it possible for us to work together toward the improvements that are needed.

The Honorable Rosel H. Hyde

I am also hopeful that we can avoid the necessity of a lengthy review of this matter in the courts and in the Congress.

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It has never been our position that because the Government has the right to procure services directly from COMSAT that such right should be exercised indiscriminately and without taking into account the impact that such direct acquisition of services may have on the industry. I should also make it clear that even in those instances where direct service is authorized we have always recognized the right of the FCC to establish rate schedules as well as to issue appropriate licenses and permits.

The question of cost is also an important element of this matter. On the basis of the recent common carrier tariff filings for cable circuits in the Pacific, the charges proposed by COMSAT for the half-circuit cost associated with a current Department of Defense procurement amounted to an over-all saving on the order of \$6 million for 30 voice channels over a 3-year period. These savings are obviously substantial and in the interest of Government economy should be given serious consideration.

Since the Commission has, in the past, followed the policy of respecting the findings of the Executive Branch with respect to matters of urgency and military necessity, I am assuming that the Commission does not intend to change this policy and to enter upon an alternate course of questioning the nature of Governmental need of contracts placed for the provision of communications satellite services.

In view of the potential problems and conflicts introduced by that portion of the Commission's Public Notice of June 23, 1966, which deals with the U.S. Government as an authorized user, I would like to suggest reconsideration by the Commission and further effort to reach a cooperative policy which will better serve the needs of the Federal Government.

Sincerely. EMARADO _

J. D. O'Connell

COMMUNICATIONS COMMISSION



WASHINGTON, D. C. 20554

87035 PUBLIC NOTICE -C July 21, 1966

FCC ISSUES FORMAL OPINION IN MATTER OF COMSAT "AUTHORIZED USER" SERVICES

The Commission has adopted a Memorandum Opinion and Statement of Policy in its inquiry into legal and policy questions concerning authorization relating to the provision of satellite communications services by ComSat directly to non-carriers. (Docket No. 16058) As stated in an advance announcement (Public Notice of June 23, 1966, FCC 66-563), the Commission has concluded that: (a) ComSat may, as a matter of law, be authorized to provide service directly to non-carrier entities; (b) ComSat is to be primarily a carrier's carrier and in ordinary circunstances users of satellite facilities should be served by the terrestrial carriers; and (c) in unique and exceptional circumstances ComSat may be authorized to provide services directly to non-carrier users, therefore, the authorization to ComSat to provide services directly is dependent upon the nature of the service, i.e., unique or exceptional, rather than the identity of the user. The policy recognizes that the United States Government has a special position, because of its unique or national interest requirements and that ComSat therefore may be authorized to provide service directly to the Government, if such service is required to meet unique governmental needs or if otherwise required in the national interest, in circumstances where the Government's needs The cannot be effectively met under the carrier's carrier approach. Memorandum Opinion also indicated the nature of the procedures to be followed by ComSat seeking authority to provide service to non-carriers.

These conclusions are based upon Commission determinations that the terrestrial carriers cannot under existing law themselves be licensed to operate the international space segment and therefore cannot compete effectively with ComSat in furnishing satellite service to the public. ComSat is not and does not propose to be a full service carrier meeting directly the needs of the vast majority of users of international services for all classes of communication services. If CorSat were to be permitted to provide leased channel services directly to users, other than in unique or exceptional circumstances, the basic purposes of Corgress in enacting the Satellite Act -- reflection of the baseful of the new technology in both quality of service and charges therefor -- would be frustnated. A requirement that, except in unique and extraordinary circumstances, users take service from the terrestrial carriers, should not have adverse effects upon either ComSat or the users 5- "1

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but instead should make it possible to reduce rates for all classes of users.

The Commission also announced that, in furtherance of the aforementioned statutory policy with respect to rates, it expects the common carriers promptly to give further review to their current rate schedules and file revisions which fully reflect the economies made available through the leasing of circuits in the satellite system. Failure of the carriers to do so promptly and effectively, the Commission stated, will require the Commission to take such actions as are appropriate.

-FCC-

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

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Authorized	entities and author-
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tions Satel	lite Act of 1962

Docket No. 16058

MEMORANDUM OPINION AND STATEMENT OF POLICY

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In the Matter of

By the Commission: Commissioner Johnson not participating.

Preliminary Statement

1. During April, May and June, 1965, the Commission received requests from several concerns (including press wire services, a newspaper, a television network, and an airline) for information regarding procedures to be followed in order that such concerns might be authorized to obtain satellite telecommunication services directly from the Communications Satellite Corporation (ComSat). On May 28, 1965, ComSat forwarded to the Commission its initial tariff, offering channels of communication via satellite to communications common carriers only. In an accompanying letter of transmittal, the Corporation stated that in the event that any other entities, foreign or domestic, were to be authorized to obtain channels directly from ComSat, it would expect to supplement its tariff to provide for the offering of such channels.

2. On June 16, 1965, the Commission issued a Notice of Inquiry stating that the foregoing developments presented issues concerning the extent to which, as a matter of law, entities in the United States other than communications common carriers can be authorized, under the Communications Satellite Act of 1962 (Satellite Act), to obtain telecommunication services directly from ComSat; the extent to which, as a matter of policy, such entities should be authorized to obtain services; the nature and scope of such services; the type of entities which may be deemed eligible to obtain the services; the nature and extent of the authorization required; and the policies and procedures which the Commission should establish to govern applications for such authorization.

3. Legal briefs and comments were received on or before November 1, 1965, from Aeronautical Radio, Inc. (ARINC) and the Air Transport Association of America (ATAA), filing jointly; the American Telephone and Telegraph Company (AT&T); the Columbia Broadcasting System, Inc. (CBS); the Communications Satellite Corporation (ComSat); the Administrator of General Services (GSA); the GT&E Service Corporation (GT&E); the Hawaiian Telephone Company (Hawaiian); the International Business Machines Corporation (IEM); the International Educational Broadcasting Corporation (IEBC); ITT World Communications, Inc. (ITT); Merrill Lynch, Pierce, Fenner & Smith, Inc.; the Communications Committee of the National Association of Manufacturers (NAM); United Press International, Inc. (UPI); the United States Independent Telephone Association (USITA); Western Union International, Inc. (WUI); and the Western Union Telegraph Company (WU).

4. In addition to the briefs and comments received from the above listed parties, general comments or statements were received from American Broadcasting Companies, Inc. (ABC); the American Communications Association (ACA); the American Newspaper Publishers Association (ANPA); the American Petroleum Institute (API); the American Trucking Association (ATA); the Associated Press (AP); the Communications Workers of America AFL-CIO (CWA); Dow Jones & Company, Inc.; Eastern Airlines, Inc.; RCA Communications, Inc. (RCAC); and the Washington Post Company (the Post).

5. On or before January 3, 1966, reply comments were received from ARINC and ATAA filing jointly; AT&T; the Association of American Railroads (AAR); ComSat; GSA; Hawaiian; IBM; ITT Worldcom; RCAC; WUI; and WU.

6. An analysis of the briefs, comments and reply comments indicates that the filing pargies have focused primarily on the initial question of the Notice of Inquiry, i.e., the extent to which, as a matter of law, entities in the United States other than communications common carriers may be granted access to the facilities and services of ComSat. The second point to which attention was given is the question of policy relating to non-carrier access to the satellite system directly through ComSat. Relatively few parties addressed themselves to the questions of the nature of authorized entities, the nature and scope of authorized services, and the policies and procedures to be adopted by the Commission for handling and disposing of applications for authorization of direct access to the satellite system. 7. We shall discuss first the basic legal questions raised and then the policy issues. However, the two are interrelated and aspects of policy are necessarily developed in the ensuing discussion of the legal issues.

Basic Legal Issues

8. The critical question is the extent to which the Satellite Act contemplates, permits or requires that ComSat be authorized to provide service directly to entities other than carriers. In general, respondents to our Notice took one of the following positions:

> (a) The terrestrial carriers allege that the Satellite Act does not contemplate or permit ComSat to be authorized to provide service to any non-carrier entity, with the possible exception of the Government;

(b) The non-carrier entities allege that the Act contemplates that ComSat should be permitted to provide service to them and that the Commission should issue authorizations upon appropriate findings that the particular service sought would be in the public interest;

(c) The Administrator of General Services (GSA) alleges that ComSat is authorized by the Satellite Act to provide service directly to the Government without restriction or limitation whenever the Government desires to take such service;

(d) ComSat alleges that it should provide service to non-carriers when (i) the carriers fail to provide a requested service via satellite although capacity is available; (ii) there is a need for development of technology or provision of new satellite services and then only during the early developmental stage; and (iii) in which and any other case there is a finding that the public interest would be served by the authorization. ComSat also took the position that it is authorized by the Satellite Act to provide service directly to the Government in any instance when the Government requests service.

9. We note that the term "authorized users" appears twice in the Satellite Act. The first time is in the section setting forth the policy and purpose of the Act where, among other things, it is declared that "It is the intent of Congress that all authorized users shall have nondiscriminatory access to the system ... " (Section 102(c)). The second time is among the powers and purposes of ComSat when it is stated that ComSat is authorized "to contract with authorized users, including the United States Government, for the services of the communications satellite system ... " (Section 305(b)(4)). Reference is also made to another term "authorized entities" in Section 305(a)(2), which states that ComSat may "furnish, for hire, channels of communication to United States communications common carriers and to other authorized entities, foreign and domestic ... " Neither the term "authorized user" nor "authorized entity" is defined in the Satellite Act, nor is the use of the different terms, "channels of communications" in 305(a)(2) and "service of the communications satellite system" in Section 305 (b)(4), explained in the Act or the legislative history. In addition to those terms the Satellite Act makes reference to "authorized carriers," particularly in Section 201(c)(2) and (c)(7). This term is defined in Section 103(7) as part of the definition of communications common carrier", 1/

1/ Communications Satellite Act of 1962, Section 103(7):

As used in this Act, and unless the context otherwise requires -- the term "communications common carrier" has the same meaning as the term 'common carrier' has when used in the Communications Act of 1934, as amended, and in addition includes, but only for purposes of Sections 303 and 304, any individual, partnership, association, joint-stock company, trust, corporation, or other entity which owns or controls, directly or indirectly, or is under direct or indirect common control with, any such carrier; and the term 'authorized carrier', except as otherwise provided for purposes of section 304 by section 304(b)(1), means a communications common carrier which has been authorized by the Federal Communications Commission under the Communications Act of 1934, as amended, to provide services by means of communications satellites.

The Contention That "Users" and "Entities" Are "Carriers".

10. AT&T contends that because there are different possible categories of "carriers" it was necessary "to recognize in the language of Section 305 that ComSat could deal with foreign entities authorized by the Commission to act as carriers here in the United States." (AT&T brief, Nov. 1, 1965, p. 13). AT&T also claims "it must be recognized that there are United States telecommunications entities which operate offices abroad, such as RCA Communications, Inc. and Globe Wireless, Ltd." (Ibid.) It is not explained why both classes of entities are not reasonably to be considered as included in the term "carriers", but AT&T concludes that because of the non-domestic status of these "carriers" they had to be referred to as "entities" or "users" in the Act. This contention completely ignores the language of Section 305(a)(2) and (b)(4) and the broad language of Section 102(c).

11. In particular, Section 305(a)(2) refers to "United States communications common carriers and to other authorized entities, foreign and domestic." In Section 305(b)(4) the Act provides that ComSat is authorized "to contract with authorized users, including the United States Government. ... "In these provisions it is clear that Congress contemplated that ComSat could be authorized to provide service directly to entities other than common carriers. We note that that finding is further supported by the declaration in Section 102(c) that, "It is the intent of Congress that all authorized users shall have nondiscriminatory access to the system Since "authorized users" may include the United States Government, a non-carrier (Section 305(b)(4)), and since under the Act ComSat may be authorized to furnish channels for hire to carriers and "other authorized entities, foreign and domestic", the terms "authorized users" and "authorized entities" must include more than only "communications common carriers." We therefore reject the contention that the terms "carriers", "entities" and "users", as used in the Satellite Act, are synonymous, and must be read as synonymous.

12. ITT Worldcom contends that in view of the necessity for any "authorized user" to utilize earth terminal station facilities for access to the satellite system, and in view of the specific language of the Act, particularly Section 201(c)(7), limiting authorized construction and operation of satellite earth terminal stations to ComSat and "authorized carriers": "the term 'authorized users' in Section 305(b)(4) can thus include only those authorized to use the satellite system to create telecommunications channels pursuant to authority to operate a satellite terminal. No one else: neither television networks, news wire services, nor other users of leased channels are or can be within the scope of the term." (Brief, October 29, 1965, pp. 7-8)

ITT is confusing authorized operation with access. Authority to operate satellite terminal stations is limited as ITT alleges. However, Congress differentiated between the two matters by its statement in Section 102(c) that: "... it is the intent of Congress that all authorized users shall have nondiscriminatory access to the system" (emphasis supplied). In view of this statement of intent and in the absence of any provision excluding any entity not an operator from access to the system, we reject ITT's contention that to be a user of the system one must be eligible to construct and operate a satellite terminal facility.

The Contention That the Commission is Empowered Only To Authorize Carrier Access to the Satellite System.

13. AT&T, RCAC and others point out that, as a matter of law, the Commission may exercise only those powers expressly delegated to it by Congress. All concur that the Satellite Act empowers the Commission to authorize "carriers" to use and have access to the facilities of the satellite system. However, RCAC, after citing selected provisions of Section 201(c), contends that "these are the only provisions of the Satellite Act which grant the Commission the power to authorize use of the satellite system and, as is evident, they are limited to carriers." (Statement of RCAC, November 1, 1965, p. 4).

14. We agree that the provisions of Section 201(c) of the Satellite Act delegate to the Commission positive power to assure equitable and nondiscriminatory access to the satellite system by communications common carriers. We believe, however, that this provision was inserted because of the fact that ComSat was to serve primarily as a carrier's carrier. Heretofore, under the Communications Act of 1934, as amended, the rendering of service by a carrier to a carrier has not been considered a common carrier function subject to regulation in the same way as service to the public. Instead, such control as the Commission found essential has been exercised by the imposition of conditions in instruments of authorization. Congress was fully aware of this situation and made both general and specific provisions to assure that the Commission had ample direct legislative authority to deal with the matter. In Section 401 of the Satellite Act it made the services rendered by one carrier to another a regulated service, and in Section 201(c)(2) specifically spelled out how this requirement was to be implemented in the case of access to earth terminals.

15. A similar situation does not obtain with respect to any possible service ComSat may be authorized to provide to non-carrier entities. The Satellite Act provides specifically (Section 401) that ComSat is deemed a common carrier within the definition of that term in the Communications Act and is fully subject to the provisions of Titles II and III of the Communications Act not inconsistent with the Satellite Act. Thus, any non-carrier entity whom ComSat might be authorized to serve is already guaranteed just and reasonable charges by Section 201(b) of the Communications Act and protected against unjust or unreasonable discrimination in charges, practices, classification, regulations, by Section 202 of that Act. . These facilities or services provisions are further implemented by detailed requirements for tariff filing and powers given the Commission to prescribe charges and practices. Under these circumstances no additional provisions were necessary to protect the rights of non-carrier entities. The carriers would have us read Section 201(c)(2) of the Satellite Act as a directive to exclude all non-carrier entities from access to the system. The above discussion makes it clear that the carriers are attempting to convert a shield included by Congress to protect them against possible improper acts into a sword to strike down others who might seek to be given such access under other provisions of law. This is not what Congress meant by this provision. The Satellite Act must be read as a whole and administered to give effect to its general purposes. We therefore reject this . contention of the carriers.

The Contention That the Commission Ts Without Guidelines Or Criteria To Authorize Non-Carrier Access.

The carriers contend that the Satellite Act contains no standards 16. pursuant to which the Commission might authorize access to the system by any entity other than a communications common carrier. The Satellite Act and the expressly incorporated Communications Act provide for necessary determinations of this kind by the Commission. The Communications Act directs that the Commission, acting in accordance with the standard of public convenience, interest, or necessity, grant radio licenses (Section 307(a)); "prescribe the nature of the service to be rendered by each class of licensed stations and each station within any class" (Section 303(b)); study new uses for radio and generally encourage the larger and more effective use of radio in the public interest (Section 303(g)); and make such rules and regulations and prescribe such restrictions and conditions, not inconsistent with law, as may be necessary to carry out the provisions of the Act. (Section 303(r)). 2 / Complementing these provisions, which are expressly incorporated into the Satellite Act (Section 401 of that Act), the Satellite Act itself contains the declaration that "It is the intent of Congress that all authorized users shall have nondiscriminatory access to the system; . . . [and] that the Corporation created under this Act be so organized and operated as to maintain and strengthen competition in the provision of communications services to the public... "(Section 102(c)). To implement this intent, the Commission is directed to "make rules and regulations to carry out the provisions of this Act." (Satellite Act. Section 201(c)(11)).

17. Congress thus specified the necessary broad standards or guidelines to be followed by the Commission in making requisite judgments. NBC v. U.S., 319 U.S. 190 (1943). It did not establish rigid or detailed criteria for regulation of new and dynamic techniques of communication. See <u>Philadelphia Television Broadcasting Co. v. FCC,</u> U.S. App. D.C. _______, 359 F.2d 282, decided March 28, 1966. Rather, Congress left to the informed discretion of the Commission the establishment of the methods, procedures, and particular criteria for authorization of provision of services by communications common carriers to other carriers and the general public. The Commission is to make its judgment based upon an evaluation of the often changing situation and the Congressional concern with the public interest in (1) encouraging wider and more effective use of radio techniques; (2) assuring that competition is maintained and strengthened in the provision of communication services to the public; (3) assuring that

2 / Further, Section 201(b) provides that communications by wire or radio subject to this Act may be classified into such ". . classes as the Commission may decide to be just and reasonable. . ". access to the satellite system shall be available to all authorized users on a nondiscriminatory and equitable basis; and (4) assuring that the benefits of new technology shall be reflected in service made available to the public through both improvements in the quality of service and the realization of all possible economies. The standards established by the Communications Act for authorizing carriers to provide service to the public are applicable to satellite services as well as to other telecommunication services. The contention that the Commission cannot authorize ComSat to provide noncarrier users direct access to the satellite system because there are no guidelines or standards for such authorization is, therefore, without merit.

The Contention that the Legislative History Of the Act Indicates Congressional Intent to Limit Access Exclusively to Carriers.

18. We think that the Act clearly empowers the Commission to authorize ComSat to provide service to entities other than carriers. The legislative history of the Satellite Act further supports this conclusion. ComSat was intended by Congress to serve primarily as a carrier's carrier, that is, ComSat is to use its licensed facilities primarily to provide satellite capacity to other carriers which in turn will utilize such capacity, together with all of their other facilities (e.g., cable, HF radio, scatter systems), to furnish service to the using public. But the legislative history of the Act indicates Congressional intent that entities other than communications common carriers could be authorized direct access to the satellite system under appropriate circumstances. In a speech made on the floor of the Senate immediately prior to Senate passage of the Satellite Act (108 Cong. Rec. 16920), Senator John O. Pastore explained that ". . . the satellite corporation under H.R. 11040 will serve mainly the carriers" (emphasis added). Significantly, he did not say that ComSat would serve exclusively as a carrier's carrier.

19. On February 7, 1962, President Kennedy submitted a proposal to the Congress calling for establishment of a privately owned communications satellite corporation in which carriers were to have a share of ownership. The President's letter of transmittal states that the administration's proposed bill sets forth "purposes and powers of the new corporation (which) would include furnishing for hire channels of communication to authorized users, including the U.S. Government." In the course of subsequent hearings, testimony was heard from all Government agencies concerned with the legislation, several Senators, communications common carriers, and other interested persons. The comprehensive and detailed Committee Report on the bill, delivered by Senator Pastore from the Senate Committee on Commerce on June 11, 1962, states:

> It will be the purpose of the Corporation to plan, initiate, construct, own, manage and operate, in conjunction with foreign governments and business entities, a commercial communications satellite system, including satellite terminal stations when

licensed therefor by the Federal Communications Commission. It will also be its purpose to furnish for hire channels of communication to United States communications common carriers who, in turn, will use such channels in furnishing their common carrier communications services to the public. Provision is also made whereby the corporation may furnish such channels for hire to other authorized entities, foreign and domestic. (pp. 10-11) (Emphasis added).

Thus, both the President's message transmitting the bill to Congress, and the Report of the Senate Commerce Committee recognized that the Corporation could be authorized to render telecommunication services to entities other than communications common carriers. We conclude that it was the intent of Congress that the Commission could authorize ComSat to afford access to the satellite system by non-carrier entities upon a proper finding that such access would serve the public interest and comport with the purposes and policies of the Satellite Act.

Authorization of Non-Carriers to Deal With ComSat Must Be Regulated by the Commission and Be On A Specified Basis.

20. ComSat can thus be authorized to serve non-carriers directly. But it does not follow, as some of the non-carriers appear to contend, that such authorization is to be left unregulated -- that ComSat and the noncarriers are free to contract as they wish. Were that the case, ComSat could readily become, to a very substantial extent, a common carrier dealing directly with the public. But as stated (par. 18), and indeed acknowledged by all parties, ComSat was and is to serve primarily as a common carrier's common carrier. 3/ Further, under unrestricted dealings between ComSat and non-carriers, large users might tend to contract directly with ComSat, while members of the general public are left to deal with the carriers. In such circumstances, it would be clearly impossible for the Commission to carry out its responsibility under Section 201(c)(5) to ". . .insure that any economies made possible by a communications satellite system are appropriately reflected in rates for public communication service." We also note here our responsibility under the Communications Act to conduct our regulatory activities in such fashion,

> ". .. as to make available, so far as possible, to all the people of the United States a rapid, efficient, Nation-wide, and world-wide wire and radio communication service with adequate facilities at reasonable charges. ..."

3/ Senate Committee on Commerce, Report No. 1584, June 11, 1962, pp. 18, 28-29; see also remarks by Senator Pastore on the floor of the Senate, 108 Cong. Rec. 16920.

There is another basic tenet of the Satellite Act which would be violated by unrestricted dealings between ComSat and non-carriers. At least insofaras international common carrier communications services are concerned, ComSat is given a virtual statutory monopoly position with respect to the operation of the space segment of the commercial communications satellite system. See Sections 102(d) and 305(a)(1) of the Act. The Commission is not given authority to license any other United States carrier to operate the space segment of a satellite system to provide international communication service; instead, such carriers must procure the space segment facilities from ComSat. Clearly, if there were to be unrestricted dealings of ComSat with the public, it would mean that ComSat would be using its monopoly position to the detriment of the other carriers and, indeed, to deprive them of the opportunity to serve segments of the public under fair and equitable conditions.

21. Direct access by non-carriers to the satellite system must therefore be regulated in such manner as to insure consistency with the Acts' purposes and with ComSat's primary role as a common carrier's common carrier. There is no question but that such regulation is a function which the Commission must discharge. This follows from the provisions of the Communications Act and the Satellite Act cited in par. 16. Just as the Commission is to authorize the communications common carrier, so also it is the agency to specify the "other authorized" domestic entities referred to in Section 305(a)(2) (and see 305(b)(4)); indeed, the user must be "authorized" and no one can seriously argue, in light of the statutory scheme, that such authorization can stem from other than this agency. 4 / For, under Section 401 of the Satellite Act, ComSat is designated as a communications common carrier subject to the provisions of Titles II and III of the Communications Act. In the process of issuing authorizations to ComSat as a common carrier and reviewing its tariffs, the Commission is required, under the public interest standard, to take into account and specify the conditions under which ComSat can depart from its primary role as a common carrier's carrier and provide service directly to the public. 5/ Further, it is the Commission's

4 / Significantly, the "authorized user" provision in Section 305 is in the section setting forth "the purposes and powers of the corporation"; the corporation, in turn, is subject to the regulation of the Commission ("the FCC shall be responsible for the regulation of the corporation", Sen. Rept. 1584, 87th Cong., 2d Sess., p. 12).

5 / There is nothing unusual about the concept of a special purpose carrier. The Commission has, since its inception, licensed Press Wireless, Inc., except in unique circumstances, to handle only press traffic. The contention of ARINC and ATAA that "there would appear to be no need for the Commission additionally to undertake the unprecedented action of regulating users of ComSat" (Comments of ARINC and ATAA, November 1, 1965 p. 12), is thus based upon a misconception of the Commission's role. responsibility to issue regulations or policy statements to insure that authorized users have nondiscriminatory access to the system. See Sections 102(c); 201(c) (11) of the Satellite Act. Finally, we note here that the intent of Congress was stated by then Deputy Attorney General Katzenbach in response to questions from Senator Kefauver regarding use of the services of ComSat for various purposes, including weather reporting:

> "You have to have an agency [the Federal Communications Commission] which is going to control these users, which is going to act in the governmental interest . . . "6/

The Government's Position As Authorized User - GSA's Contentions.

22. We turn now to consideration of the Government's position as an authorized user. There is no question but that the Government is to be included in the category of "authorized user". See Section 305 (b) (4). We disagree, however, with GSA's assertion that ComSat may provide direct satellite communications service to the Government, without any limitation or restriction. Rather, the Satellite Act makes clear that ComSat's direct dealings with the Government must be of such a nature as to be consistent with the Act's purposes and objectives. Thus, ComSat is authorized in Section 305 to furnish channels of communication " . . . to other authorized entities . . ." ((a) (2)) and "to contract with authorized users, including the United States Government . . . ", in "order to achieve the objectives and to carry out the purposes of the Act" (emphasis supplied). These provisions must therefore be read in terms of the objectives and purposes of the Act. Section 102 (c) sets forth the following pertinent purposes:

> "... It is the intent of Congress that all authorized users shall have nondiscriminatory access to the system; that ... the corporation created under this Act be so ... operated as to maintain and strengthen competition in the provision of communications services to the public ..."

6 / Hearings before the Subcommittee on Antitrust and Monopoly of the Senate Committee on the Judiciary, 87th Cong., 2d Sess., pp. 55-56 (1962). 23. Some further brief comment upon the last listed statutory purpose is appropriate. Were ComSat to be operated as GSA urges -- unrestricted direct dealings with the Government -the result, as we develop with specific figures (see par.), would not be to maintain or strengthen competition in the provision of communications services to the public. Rather, it would seriously weaken the competitive forces. Section 201 (a) (6) lends added support to the Congressional intent to maintain or strengthen competition in the provision of communications services to the public. The main thrust of that section is to insure that satellite facilities provided by ComSat will be utilized for general governmental

purposes except where a separate system is required in the national interest. See Senate Report No. 1319, 87th Cong. 2d Sess., p. 4; 7_/ Senate Report No. 1584, 87th Cong., 2d Sess., p. 15.

24. The foregoing considerations are thus consistent with the general concept pervading the Satellite Act of ComSat as a monopoly (insofar as the space segment of international communications is concerned) and as primarily a carrier's carrier, created to provide at least the space segment of international communications as part of an improved global communications network consisting of all means of providing such communications services, so that lower rates should be possible to all the using public. There is, we believe, every indication in the statute that the nature and extent of direct dealings between ComSat and GSA or any other government agency, in its role as a user, must be considered in the light of the effect of such dealings upon the statutory scheme, the rights of the other carriers in the face of ComSat's monopoly, the total global network of services, which includes cables, HF radio and other media as well as satellite facilities, and the quality of services or charges to the general using public.

7/ The Committee, which originated the provision essentially in the form in which it now stands, described the provision in the following terms: that the President is to ["t]ake necessary steps to insure utilization of the commercial system for general governmental purposes whenever there is no requirement for a separate communications system to meet unique governmental needs". Senate Report No. 1319, p. 4.

25. This does not mean that the Government does not have a special status under the Satellite Act. As shown by the provision in Section 305 (b) (4), it clearly does. We believe -that the explicit specification of the Government as an authorized user stemmed from Congressional recognition of the special or unique nature of the communications needs that may arise in the Government's case, precisely because of the special or unique functions of the Government. We believe that the standard for direct dealings between ComSat and the Government is thus embodied in the Act in the sections dealing with the somewhat related question of a separate Government system -- namely, if such dealing "is required to meet unique governmental needs, or is otherwise required in the national interest" (Section 201(a) (6); Section 102 (d)). Clearly, if resort can be had to a separate governmental system in order to meet unique Government needs or if otherwise required in the national interest, a fortiori, such circumstances warrant departure from the carrier's carrier approach if that approach would not effectively meet the Government's unique needs or the national interest. In short, we stress our full recognition that in the Government's case, unique or national interest circumstances can and do arise where the needs of the Government cannot be effectively met under the carrier's carrier approach. The authorization to ComSat to meet the needs of NASA's Apollo project through a specially designed system is a current example of such unique circumstances. See also Bendix Aviation Corp. v. United States, 106 U.S. App. D.C. 304, 272 F 2d 533, cert. den., 361 U.S. 965. We emphasize that in all cases where such national interest circumstances exist, we shall act promptly to authorize ComSat to provide service directly to the Government at just and reasonable rates.

Basic Policy Issues

26. In reaching our basic policy determinations we are aware that in this instance we are not confronted by a normal competitive situation, namely, one where one entity through its initiative, ability or inventiveness produces a cheaper or better means of providing service and thus captures a market, Instead, we have a situation where there is an artifical restraint upon the terrestrial carriers. They cannot ordinarily be licensed to provide the essential space segment of the international satellite circuits and thus compate with ComSat on equal terms, but must rely on ComSat which was created to provide these facilities to them. Sound policy indicates that, absent a statutory requirement to the contrary, that they should not be required to depend solely on ComSat for satellite circuits while ComSat is simultaneously allowed to siphon the most profitable part of the business from them. Neither ComSat nor anyone else proposes that ComSat meet the needs of all users, i.e. message, TELEX, and all other switched services. Thus, this is not a situation where a proposed competitor would meet all or even a major portion of the essential public needs should it supplant the other carriers.

27. No lengthy discussion of the policy considerations is needed since we have already covered a number of these considerations in the foregoing treatment of Sections such as 102(c) and 201(c)(5) of the Satellite Act. In light of those considerations and the Act's basic concept of Comsat as primarily a carrier's carrier, we believe that it would be in derogation of the policy of the Act to permit Comsat to compete with the conventional carriers in furnishing to users those communication services and channels which customarily and conventionally are or can be furnished by such carriers within the framework of their general tariff offerings. In other words, Comsat would be authorized to deal directly with the users in only those instances where the requirement for satellite service is of such an exceptional or unique nature that the service must be tailored to the peculiar needs of the customer and therefore cannot be provided within the terms and conditions of a general public tariff offering. In this connection, a current example is the satellite service which Comsat has been authorized to furnish to NASA for support of the Apollo program. Of course, Comsat should also be permitted to furnish a satellite service or channel to a user in any case where the conventional carriers fail or refuse to meet reasonable demand therefor, although they are or would be otherwise capable of doing so in accordance with general tariff offerings.

28. The wisdom of this policy is evident from the serious adverse consequences that would result if Comsat were permitted without limitation to furnish service in competition with their principal customers for satellite services and channels - the conventional carriers. In this connection, we have reviewed the nature of the proposals before us from entities which seek to be "authorized users" and take service directly from ComSat. It is clear from the filings herein that the services sought are primarily leased channel services. i.e. service which customarily and conventionally are provided by common carriers within the framework of their general tariff offerings. ComSat does not propose to, nor does anyone seek to have ComSat, provide message telegraph, message telephone, or any other exchange type of service. Yet these exchangetype services provide the bulk of the international or transoceanic services offered the public. In 1965 there were 24.2 million overseas telegrams which originated in, terminated in, or transited the United States. In the same year there were 7.9 million telephone calls between the United States and foreign or overseas points or transiting the United States between foreign points. Insofar as TELEX is concerned, in 1965 there were 3.9 million messages originating in, terminating in or transiting the United States.' On the other hand, in 1965 there were a total of about 200 voice-grade circuits (179 to U.S. Government agencies) and 400 telegraph-grade circuits (68 to U.S. Government agencies) leased between the United States and overseas points. Essentially, therefore, only a very small part of the using public using international communications facilities had sufficient traffic to justify or require leased circuit facilities.

29. When we turn to the revenue side of the picture, we find that revenues from leased circuits provide an important, if not indispensable, part of the carriers' total receipts. Thus, in 1965 all overseas carriers, voice and record, other than ComSat, reported that leased circuits provided about 16 per cent of total overseas revenues or some \$34,900,000 (\$25,300,000 from leases to U.S. Government agencies) out of a total of \$22,700,000. The importance of revenues from leased circuit traffic becomes manifest when such revenues are compared with the international record carriers' net operating revenues before federal income taxes. Reports to the Commission show that in 1965 these carriers, as a whole, had net operating revenues, before federal income taxes, of about \$20,300,000. Their revenues from leased circuit services for the same year were \$20,200,000 (\$11,083,000 from leases to U.S. Government agencies). Because of the relatively low non-fixed or variable costs associated with this service, the loss of such business could come close to wiping out completely the record carriers' earnings, unless the facilities could be immediately used for other services and produce substantial revenues, which appears unlikely.

30. Separate figures regarding net revenues or earnings of telephone carriers from overseas communication services are not readily available. However, data filed with the Commission indicate that total revenues for such services in 1965 were about \$116 million. Leased circuit services provided about \$14.7 million or 12.7 percent of these revenues. In the case of Hawaiian Telephone Company, the ratio of its leased circuit to total revenues is much greater, accounting for about one-third of its total gross overseas revenues.

9/ All figures exclude U.S.-Canada and U.S.-Mexico traffic.

31. The danger of the loss by the terrestrial carriers of existing or additional leased circuit business to satellite facilities is not merely theoretical. 10/ A recent complaint filed by ITT World Com, and a press release issued by Comsat in response thereto, indicate that ComSat would propose to charge both authorized users and carriers approximately the same amount for leased circuits and that the amount is substantially below current or recently proposed charges for leased cable circuits. Accordingly, the terrestrial carriers could reasonably be expected to lose a substantial share of thei leased circuit revenues to ComSat. Under these conditions and in light of the data set forth above, it could very well be necessary to permit these carriers to increase rates charged other users in order to enable them to earn a fair return. Certainly such detriment to the vast majority of users for the apparent benefit of a few large users would be in derogation of the objectives of the Act. 11/ The fact is that the Satellite Act requires the opposite result, namely, that the benefits of these lower rates be made available to all users.

- 10/ The situation here is not unlike that facing the international telegraph carriers when AT&T laid its trans-Atlantic high capacity cables which made voice-grade leased circuits feasible. During 1960 the government cancelled leases for circuits to Europe with Commercial Cable and Western Union's cable system resulting in a loss of revenues in that year of about \$0.5 million for each of the carriers as compared with 1959. The full annual effect of these cancellations was much greater. They could not compete effectively with AT&T because the latter proposed to lease voice-grade circuits to them at the same price as it leased these circuits to the ultimate users. The problems raised by this development were finally resolved in our TAT IV decision, American Telephone and Telegraph Company, 37 FCC 1151 (1964), wherein we required that the necessary cable facilities be owned jointly and excluded AT&T from all participation in future international voice-data leased business. This was done because of the effects that provision of such service could have on the ability of the international record carriers to provide efficient and economical record services to the public as well as the fact that the carriers could not be expected to obtain a meaningful share of the business in competition with AT&T.
- 11/ We say "apparent benefit" because we will show hereinafter that even most large scale users would probably suffer no economic detriment by a requirement that they take service from the carriers rather than directly from ComSat.

32. In light of GSA's contentions, we believe it appropriate to consider the revenue effects of ComSat providing service on an unlimited basis to the Government. We have analyzed above the potential effect of a loss of leased circuit revenues upon the terrestrial carriers. The Government as a user provided over 70% of total leased circuit revenues. In the case of voice-grade circuits which provide the bulk of such revenues, the Government is an even more important factor as it accounted for 90% of the total number of circuits leased by all users. The importance of revenues from Government leases to the international telegraph carriers and to the Hawaiian Telephone Company is shown by the table below:

Year 1965 (Thousands of dollars)

Carrier	Total Revenues	Net Revenues Before F.I.T.	Total Leased Cir- cuit Revenues	U.S. Gov't Leased Circuit Revenues a/
ITT World Com	\$29,808	\$ 4,546	\$ 5,952	\$ 3,200
RCAC	51,054	11,512	11,438	6,433
WUI	18,124	2,543	1,924	1,407
Hawaiian <u>b</u> /	14,280	N.A.	4,741	4,606

N.A. - Not available.

a/ Partly estimated.

b/ Data are for overseas services only.

For each carrier, revenues from services to the Government are essential to a fair rate of return and provide a sizeable part of its total profit margin. Thus the loss of a substantial proportion of government leased circuit revenues could have serious adverse effect upon the carriers. Instead of being able to reduce rates to reflect the lower costs of satellite circuits, they would probably have to seek substantial rate increases.

33. It might be argued that in our discussion thus far we have ignored the interests of ComSat in our concern about the potential effects of direct service by ComSat to "authorized users." This is not so. It will be recalled that ComSat has a virtual monopoly in the provision of at least the space segment for international common carrier service. Thus, to the extent that any United S ates user desires to lease satellite circuits or to the extent that ComSat, by selling activities, induces users to demand such circuits, the carriers must come to ComSat for at least the space segment of the facilities. Since, as noted above, ComSat's proposed charges to the carriers and other users would be substantially the same, it should realize substantially the same revenues whether the carriers or others lease the circuits from it.

34. We now address ourselves to the question of the effect upon prospective users of any refusal to permit ComSat to lease circuits directly to them. It appears to us that in general these users would also benefit from such a policy. We are mindful of the injunction in Section 204(c) of the Satellite Act that the Commission shall:

- 20 -

"insure that any economies made possible by a communications ..satellite system are appropriately reflected in rates for public communication services;"

Satellite circuits now becoming available should enable the carriers to secure facilities at lower costs in relation to terrestrial facilities and thereby to reduce rates to reflect such cost reductions. We therethem permit fore expect the common carriers promptly to give further review to their current rate schedules and file revisions which fully reflect the economies made available through the leasing of circuits in the satellite system. Failure of the carriers to do so promptly and effectively will require the Commission to take such actions as are appropriate. Even though satellite circuits are not now and will not for some time be available to all points to which users presently lease circuits from terrestrial carriers, implementation of this policy by the carriers should also reduce charges to many points to which satellite circuits are not now available. Furthermore, major users, require redundancy and diversity in their facilities and thus would normally be expected to use a combination of terrestrial and satellite facilities to the same points to provide such redundancy. These users may very well find that the average charge per circuit will be less if the terrestrial carriers supply all their needs than if ComSat were to be permitted to lease satellite circuits to them at lower rates, while the other carriers meet their needs for diversity and redundancy at rates reflecting the higher cable costs associated with conventional facilities such as cable and high frequency radio.

35. Aside from the foregoing considerations we note that entities which have sufficient traffic to require the lease of circuits are also large users of other international services such as message telephone, message telegraph and TELEX. To the extent that loss of leased circuit revenues might require upward adjustments or prevent contemplated reductions in rates for other services, such large users could very well find their total international communications bills increased if ComSat were to be permitted to provide leased service directly to them without limitation. 36. We therefore conclude that only in unique or exceptional circumstances should non-carrier entities deal directly with ComSat. We believe that the ascertainment of such circumstances must be left to a case-by-case approach, since it is dependent upon the nature of the particular service requested. We can state, however, that refusal or failure of the terrestrial carriers to provide, upon reasonable demand, satellite leased circuit facilities, otherwise available, would, in absence of a valid explanation, constitute exceptional circumstances. Similarly, we believe it our duty to encourage development of new uses of satellite facilities and will, upon application, issue authorizations which are best designed to further such ends. Finally, as already set forth more fully in paragraph 26, we again stress the special position of the Government, and specifically, that in the Government's case, unique or national interest circumstances can and do arise where the needs of the Government cannot be met under the carrier's carrier approach.

CONCLUSIONS

. 37.

We have reached the following policy conclusions:

- (a) The terrestrial carriers cannot under existing law themselves be licensed to operate the space segment of the international system and therefore cannot compete effectively in furnishing satellite service to the public.
- (b) ComSat is not and does not propose to be a full service carrier meeting directly the needs of the vast majority of users of international services for all classes of communication services.
- (c) If ComSat were to be permitted to provide leased channel services directly to users, other than in unique or exceptional circumstances, the basic purposes of Congress in enacting the Satellite Act -- reflection of the benefits of the new technology in both quality of service and charges therefor -- would be frustrated.
- (d) A requirement that, except in unique and extraordinary circumstances, users take service from the terrestrial carriers should not have adverse effects upon either ComSat or the users but instead should make it possible to reduce rates for all classes of users.
- 38. Our ultimate conclusions are:
 - (a) ComSat may as a matter of law be authorized to provide service directly to non-carrier entities;
 - (b) ComSat is to be primarily a carrier's carrier and in ordinary circumstances users of satellite facilities should be served by the terrestrial carriers;

- (c) In unique and exceptional circumstances ComSat may be authorized to provide services directly to noncarrier users; therefore, the authorization to ComSat to provide services is dependent upon the nature of the service, i.e., unique or exceptional, rather than the identity of the user. The United States Government has a special position because of its unique or national interest requirements; ComSat may be authorized to provide service directly to the Government, whenever such service is required to meet unique governmental needs or is otherwise required in the national interest, in circumstances where the Government's needs cannot be effectively met under the carrier's carrier approach.
- 39. We do not now propose to set forth specific procedures. However, any request by ComSat for authorization to provide service directly to any user desiring to take such service in particular circumstances should include showings by ComSat as to:
 - (i) Whether the proposed service via satellite is available from terrestrial carriers, including evidence of request made therefor and the response of the carriers;
 - (ii) Whether the facilities to provide this service are available, and, if not, a description of the new or expanded facilities required as well as the cost thereof;
 - (iii) A statement showing why the circumstances involved are so unique and exceptional as to require service directly from ComSat or what the national interest requirements are that indicate that service cannot be provided under the carrier's carrier approach.
 - (iv) Any other facts which would indicate that the public interest would be served by a grant.

The above required information shall be set forth in support of the applications for modification of the applicable earth station and/or satellite station licenses as well as for authorization to acquire units of satellite utilization which ComSat shall file in each case in which it is requested to provide a particular service directly to any non-carrier users. Unless and until such authorizations are granted, ComSat shall not provide services to any non-carrier entity. In addition ComSat, of course, must also have an effective tariff on file before it can provide service directly to any non-carrier entity it may be authorized to serve. 41. Accordingly, IT IS ORDERED, This 20th day of July, 1966, That the Statement of Policy set forth in this Memorandum Opinion and Order IS ADOPTED and that the proceeding IS TERMINATED.

FEDERAL COMMUNICATIONS COMMISSION

Ben F. Waple Secretary

Released: July 21, 1966

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

OFFICE OF THE DIRECTOR

January 31, 1967

The Honorable Rosel H. Hyde Chairman Federal Communications Commission Washington, D. C. 20554

Dear Mr. Chairman:

This is in reference to the pending application by the Communications Satellite Corporation for the furnishing of 30 satellite circuits in the Pacific.

It is requested that ComSat be given appropriate authorization to proceed with implementation of the Department of Defense requirement. Upon establishment of composite rates which afford substantial savings on a global basis, and upon the completion of suitable discussion with and approval by the foreign entities involved, the contract with ComSat for the provision of this service will be assigned to one or more of the carriers shortly after the date of initiation of service. However, prompt action on the ComSat application is called for so that ComSat may make any arrangements necessary to facilitate the provision of this vitally needed communications service.

Finally, in the circumstances, it is also requested that the Commission promptly grant the pending applications of the carriers for authorization to lease and operate the channels required to furnish the service in question. It is understood that any authorizations would establish the applicability of the reduced rates to this service (e.g., the basic \$7,100 composite rate figure).

Sincerely,

D. O'Connell
FEDERAL COMMUNICATIONS COMMISSION

WASHINGTON

OFFICE OF

February 2, 1967

General James D. O'Connell Director of Telecommunications Management Office of Emergency Planning Executive Office Building Washington, D. C. 20504

Dear General O'Connell:

I am writing in light of the action taken today on the "30 circuits" and "authorized user" matters. I want to express my appreciation for your efforts in resolving these important matters. The actions taken were possible largely because of the assurance in your letter that in view of the \$7100 composite rate already put into effect by the carriers in the Pacific, the assignment clause would be exercised by DOD shortly after the initiation of service.

As you know, there are also lower rates in the Atlantic, with plans for still further reductions on the institution of 24-hour satellite service. I want to assure you that lower composite rates, wherever satellite service is instituted, are a fundamental aspect of the Commission's regulatory policies in this area.

I believe that this experience again points up the soundness and wisdom of our joint efforts to understand each other's problems and to work together to get the solution best serving the national interest.

Sincerely yours,

Rosel H. Hyde Chairman FEDERAL COMMUNICATIONS COMMISSION



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PUBLIC NOTICE --C February 2, 1967

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WASHINGTON, D. C. 20554

AUTHORIZATIONS FOR DOD PACIFIC SATELLITE CIRCUITS; FURTHER DECISION IN AUTHORIZED USER PROCEEDING

The Federal Communications Commission has issued authorizations to Hawaiian Telephone Company, ITT World Communications Inc., RCA Communications, Inc., and Western Union International, Inc., to acquire voice-grade satellite circuits from the Communications Satellite Corporation (ComSat) to meet requirements of the Department of Defense (DOD) for thirty such circuits between Hawaii and the Far East. At the same time a short-term temporary authorization to furnish such channels to DOD was granted to ComSat at the request of the Director of Telecommunications Management (DTM) in order to permit it to make any arrangements necessary to facilitate the provision of the service. The Commission was advised by the DTM that the circuits will be assigned to the conventional carriers shortly after the initiation of service through ComSat.

At the same time the Commission acted upon petitions for reconsideration filed by various parties with respect to its Memorandum Opinion and Order and Statement of Policy (Docket No. 16058) released on July 21, 1966 dealing with the circumstances under which ComSat may be authorized to furnish satellite channels and services to entities other than the conventional common carrier. Among other things, the Commission clarified certain aspects of its earlier opinion concerning requests by ComSat for authorization to provide service directly to the U. S. Government.

The foregoing actions were taken by the Commission by the adoption of Memoranda Opinions and Orders.

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FCC 57-153

94724

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

In the Matter of the Applications of 3 File Nos. T-C-2014) ITT WORLD COMMUNICATIONS INC. T-C-2025 WESTERN UNION INTERNATIONAL, INC.) T-C-2030 RCA COMMUNICATIONS, INC. P-C-6440 HAWAIIAN TELEPHONE COMPANY To lease from the Communications Satellite Corporation 30 satellite voice-grade circuits between Hawaii and INTELSAT II for the provision of leased channel alternate voice/data) service to the Defense Communications Agency 3 between Hawaii, on the one hand, and Japan,

In the Matter of the Application of

Thailand, and the Philippines, on the other

COMMUNICATIONS SATELLITE CORPORATION

To provide directly to the Defense Communications Agency 30 satellite voice-grade circuits between Hawaii, on the one hand, and Japan, Thailand, and the Philippines, on the other hand.

MEMORANDUM OPINION, ORDER AND CERTIFICATE

By the Commission:

The Commission has before it applications of four overseas carriers filed pursuant to Section 214 of the Communications Act of 1934 for authority to acquire from the Communications Satellite Corporation (ComSat) circuits to meet a Department of Defense (DOD) requirement for leased channel services between Hawaii and three Far Eastern points. ITT World Communications Inc. (ITT) . applied (File No. T-C-2014) on August 24, 1966; Western Union International, Inc. (WUI) applied (File No. T-C-2025) on September 14, 1966; RCA Communications, Inc. (RCA) applied (File No. T-C-2030) on September 15, 1966; and Hawaiian Telephone Company (HTC) applied File No. P-C-6440) on September 19, 1966. All the applications request authorization to lease from Comsat thirty satellite circuits between the earth station at Hawaii and the Pacific satellite, Intelsat II, to meet the DOD requirement. 1/ The circuits will be

1/ WUI also requested authorization to lease satellite circuits unrelated to the 30-circuit requirement of DCA. By separate applications, the other carriers have applied for satellite circuits unrelated to the DCA requirements for 30 circuits. We are not treating these requests herein.

File No. T-C-2032

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hand.

interconnected via the satellite with ten voice-grade satellite circuits from an earth station in Japan, ten voice-grade circuits from an earth station in Thailand, and ten voice-grade satellite circuits from an earth station in the Philippines, so as to provide through alternate voice/data leased channel service between Hawaii and each of these three foreign countries. Authority is also requested to acquire necessary connecting facilities in Hawaii.

2. Pursuant to our decision in the so-called <u>Authorized User Case</u>, Docket No. 16058, ComSat on September 6, 1966 applied (File No. T-C-2032) to us for authorization to provide such service directly to DOD, as well as for related authorizations. Thus, ComSat requests authority to acquire, from the International Telecommunications Satellite Consortium, thirty full-time units of satellite utilization in Intelsat II, to acquire from the respective foreign communications entities ten full-time voice-grade circuits between the satellite and each of the three foreign points and to provide through service to DOD by combining such units and circuits into . thirty full-time alternate voice/data circuits. ComSat based its application on an order for such circuits from DOD, acting through DCA, pursuant to its procurement regulations. The DCA order, it should be noted, is made through a Communications Service Authorization (CSA) which contains a clause permitting DCA to assign the order to a carrier or carriers other than ComSat.

3. According to information before us, Thailand and the Philippines will be able to participate in the desired service by April 1, 1967, through transportable earth stations now being installed. Japan, which is presently modifying its earth station at Ibaraki, will be in operation to provide the service some months later.

4. Initially, both DOD and ComSat, in pleadings filed with the Commission, opposed the grant of the authorizations requested by the carriers. ComSat requests that we dismiss or defer consideration of the carriers' applications. It urges, among other things, that it has a contract to furnish the 30 circuits to DOD and that no action should be taken upon the carriers' applications until its own application has been disposed of. It also refers to its pending petition for reconsideration in the <u>Authorized User Case</u>, in which we determined the conditions under which ComSat may be permitted to furnish services directly to the Government and others. DOD originally opposed a grant of the carriers' applications on the ground, among others, that, since it has chosen ComSat to provide the service, there is no need for a grant of other applications.

5. In our Memorandum Opinion and Order (concomitantly being issued with this document) on petitions of ComSit, General Services Administration, and RCAC for reconsideration of our determinations in the <u>Authorized User Case</u> regarding the circumstances under which ComSat may be authorized to serve the Government directly, we point out that the DTM is "the focal point for the judgment of the Executive agencies as to the national interest," and that "in all cases where ComSat seeks to deal directly with the Government we shall act promptly after receipt of advice from the DTM."

6. We have received advice from the DTM concerning this matter. In a letter dated January 31, 1967, DTM has stated:

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"It is requested that ComSat be given appropriate authorization to proceed with implementation of the Department of Defense requirement. Upon establishment of composite rates which afford substantial savings on a global basis, the contract with ComSat for provision of this service will be assigned to one or more of the carriers shortly after the date of initiation of service. However, prompt action on the ComSat application is called for so that ComSat may make any arrangements necessary to facilitate the provision of this vitally needed communications service. Finally, in the circumstances, it is also requested that the Commission promptly grant the pending applications of the carriers for authorization to lease and operate the channels required to furnish the service in question; it is understood that any authorizations would establish the applicability of the reduced rates to this service (e.g., the basic \$7,100 composite rate figure)."

In view of the particular circumstances of this matter, its history and 7. posture and the representations made by DTM on behalf of the Executive branch, it appears that the objections heretofore raised by the parties are moot and that we should act to grant the regular authorizations to the carriers and the short term temporary authorization to ComSat. As to the latter, the short term temporary authorization to ComSat will, we believe, facilitate both the provision of this vitally needed service and an orderly transition from ComSat to the other carriers, and is thus consistent with our policies in this area. As to the former, there is now the express representation that this service will be assigned to one or more carriers shortly after date of the initiation of the service; we recognize, of course, that DCA will determine to which carrier or carriers any particular assignment should be made. In this connection, it is to be noted that the \$7100 composite rate referred to by the DTM has in fact been implemented in tariff schedules which became effective January 20, 1967.

ACCORDINGLY, IT IS HEREEY CERTIFIED, That the present and future public convenience and necessity require the grant of the applications as conditioned below or the denial thereof as also set forth below:

IT IS ORDERED, This 1st day of February, 1967, that ComSat is granted a short term temperary authority to provide, with the respective entities in Japan, the Philippines and Thailand, to the Defense Communications Agency acting on behalf of the Department of Defense, 10 voice-grade satellite circuits between Hawaii and Japan, 10 voice-grade satellite circuits between Hawaii and the Philippines, and 10 voice-grade satellite circuits between Hawaii and Thailand, for alternate voice/data leased channel service;

IT IS FURTHER ORDERED, That the short-term temporary authorization granted to ComSat by this Order and Certificate is subject to termination, without hearing, upon such notice as may be specified; IT IS FURTHER GRATED, That ConSat shall file with the Commission a separate tariff apple ble to the service to be provided pursuant to the temporary authorization granted by this Order and Certificate, on not less than thirty days' notice to the public; that this tariff shall take into account the standards heretofore established by the Commission with respect to this matter, and that this tariff shall provide that it expires on the date the temporary authorization granted herein is terminated;

IT IS FURTHER ORDERED, That, except for the temporary authorization granted to ComSat by this Order and Certificate, and the previous authorization granted to ComSat to acquire units of utilization to provide the 30 circuits by the Commission's letter of January 26, 1967, the application of ComSat filed on September 6, 1966, File No. T-C-2032, IS DENIED.

IT IS FURTHER ORDERED, That ITT World Communications Inc., Western Union International, Inc., RCA Communications, Inc., and Hawaiian Telephone Company are each authorized to lease and operate up to 30 voice-grade circuits between Hawaii and the INTELSAT II (F-2) satellite in order to furnish up to ten circuits for alternate voice/data leased channel service to the Defense Communications Agency acting on behalf of the Department of Defense between Hawaii and each of the following points: Japan, Thailand, and the Philippines; <u>Provided, however</u>, (1) that the actual number of circuits that any such carrier may lease and operate pursuant to this authorization shall not exceed the number of circuits ordered from such carrier by the Defense Communications Agency; and (2) that the initial tariff rate for each such circuit between Hawaii and the INTELSAT II (F-2) satellite shall not exceed \$7,100 per month;

IT IS FURTHER ORDERED, That the carriers may file tariffs on not less than one day's notice to provide the services to those points when they receive orders from the Defense Communications Agency;

IT IS FURTHER ORDERED, That as circuits to a particular point (Thailand," the Philippine Republic, or Japan) are ordered by the Defense Communications Agency from a carrier in lieu of ComSat, the short-term temporary authorization herein granted to ComSat shall terminate without further action by the Commission upon the institution of service by such carrier;

IT IS FURTHER ORDERED, That ConSat and the carrier applicants are authorized to acquire any necessary connecting facilities in Hawaii so long as their respective authorizations are in effect; and

IT IS FURTHER ORDERED, That each of the carrier applicants shall notify the Commission of the acquisition, by that applicant, of any of the circuits herein authorized within five days of such acquisition.

FEDERAL COMMUNICATIONS COMMISSION

Ben F. Waple Secretary

Released: February 3, 1967

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FEDERAL	COMMUNICATION	S COMMISSION
	Washington, L). C.

FCC 67-164 94725

In the Matter of

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Authorized entities and Authorized users under the Communications Satellite Act of 1962

MEMORANDUM OFINION AND ORDER

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By the Commission:

Preliminary Statement

1. We have before us several petitions for reconsideration and clarification of our Memorandum Opinion and Statement of Policy released July 21, 1966, in this proceeding. These petitions, which vary as to the relief sought, were timely filed on August 22, 1966 by the Communications Satellite Corporation (ComSat); the Administrator of General Services (GSA); and RCA Communications, Inc. (RCAC). Oppositions to either or both the Comsat and GSA petitions were filed on September 16, 1966, by the American Telephone and Telegraph Co. (AT&T); ITT World Communications Inc. (ITT WorldCom); Hawaiian Telephone Co. (HTC); Western Union Telegraph Co. (WU); Western Union International, Inc. (WUI); Aeronautical Radio, Inc., and the Air Transport Association of America, jointly (ARINC and ATA); and RCAC. Comsat on September 16, 1966 filed a response to the RCAC and GSA petitions, opposing the former and supporting the latter. It filed a reply to the oppositions to its own petition on October 14, 1966.

The document to which the petitions are addressed grew 2. out of our inquiry into, among other things, the extent to which Comsat may be authorized to provide channels or services to persons other than , and the extent to communications common carriers, which Comsat should, as a matter of pulicy, be so authorized by the Commission. In essence, we held, for the reasons set forth in our decision that, although Comsat may lawfully be authorized to provide service to non-carriers, it was primarily a carrier's carrier and should serve noncarriers directly only in unique or exceptional circumstances. The petitioning parties express widely divergent views. RCAC seeks more specific procedural controls on ComSat's negotiations with the various entities, including foreign users; CSA seeks clarification of the unique position of the government as a user; ConSat seeks broader authority to deal with users other than common carriers, including the Covernment itself.

Docket No. 16058

3. We shall deal first with the contentions directed to the Government's position as a user (See Part I, below). We shall then deal with the other contentions, and, in particular, those of ComSat as to the alleged restrictive effects of our decision (Part II) and of RCAC as to the need for certain procedural revisions (Part III). Any contention not treated in the following discussion is rejected for the reasons set forth in our prior report.

Part I. The Contentions With Respect to the Government's Fosition as Authorized User

4. CSA and ConSat filed petitions for reconsideration with respect to that portion of our decision dealing with the Government's position as an authorized user. As to some of the matters raised, our prior decision already sets forth our position, and we will not, therefore, here repeat the discussion in that decision. However, we agree with GSA that clarification of our July 21 decision in some important respects is called for.

5. First, we shall, as requested by GSA stress again the wide area of agreement. We agree -- and so stated in our decision of July . 21 -- that the Government has a special status under the Satellite Act. See par. 25 and discussion therein; Section 305(b)(4) of the Satellite Act. We also agree that with respect to this matter the Director of Telecommunications Management (DTM) has a special role and responsibility, in view of the special duties assigned to the DTM by the President in the telecommunication field (e.g., Executive Order 11191). We pointed out in our July 21 decision that in certain instances the Government has a special position because of its unique and national interest requirements, and that ComSat may be authorized to provide service directly to the Covernment whenever such direct service is in the national interest. Clearly, in view of the foregoing, the DTM is the focal point for the judgment of the Executive agencies as to the national interest. Finally, we recognize that the determination of communications services needed because of defense requirements in the national interest is a matter peculiarly within the province of the Executive. Cf. Bendix Aviation Corp. v. U.S., 272 F. 2d 533, 106 U.S. App. D.C. 304, cert. den., 361 U.S. 965.

6. Accordingly, we have concluded that our prior decision, and particularly Paragraphs 38(c) and 39, did not appropriately delineate the situation with respect to the Government as an authorized user and the procedures applicable therato. We recognize that Comsat may be authorized to provide service directly to the Government whenever such direct service is in the national interest, and that karagraph 39 should

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not be applicable to service to the Government. While no specific procedures or criteria (other than the national interest) are proposed with respect to this governmental facet, in all cases where ComSat seeks to deal directly with the Government we shall act promptly after receipt of advice from the DTM. In acting on requests by Comsat for authorization to provide service directly to the Executive, it is the DTM, and not Comsat, to whom the Commission may turn with respect to the critical national interest facet. Our decision is hereby amended to the extent of reflecting the foregoing revisions.

Part II. Comsat's Contentions Concerning the Alleged Effects of cur Policy.

7. Comsat states that, apart from direct service to the Government, its statutory mission may be best accomplished by affording the conventional carriers full opportunity to provide satellite service, reserving the opportunity to provide direct service to users in justified and enumerated. circumstances when necessary to spur development and utilization of satellite communications. Specifically, it says, it has urged that we recognize its right to serve users directly (a) where conventional carriers fail to make a desired satellite service available on reasonable terms; (b) where a new satellite service is provided on a developmental basis; and (c) where such service to a user or class of users would in a particular case be in the public interest. While it feels that we have adopted these suggestions in principle, it is concerned that we may in practice adopt an unduly restrictive approach which may undermine the salutary effect of defined exceptions to the "carrier's carrier" policy. In particular, it is gravely disturbed by what it considers an adoption by us of a composite rate approach, under which satellite economies are realized by users only through reduction in charges made for services provided over all media, which it seems to feel, militate against separate rates for satellite services.

8. As Comsat points cut, the approach we have taken is consistent with its own thinking as to the role of being primarily a carrier's carrier, dealing directly with users as an exception to that general principle. We are, of course, well aware of our responsibilities for encouraging the development and use of satellite communications, as well as for seeing that needs of users are effectively met. The point we were stressing, however, was that this should not be at the undue expense of the vast majority of users, who would not be in a position to go to Comsat directly. We also have a general responsibility to the public, which necessarily must be harmonized with our particular responsibilities for satellite communications, to assure adequate service at reasonable charges and to take steps to assure that the conventional carriers responsible for general service can meet this obligation. The concern expressed in our decision was over the danger implicit in competition between Comsat, having a favored position with respect to a more economical medium, and conventional carriers who are at a disadvantage in not being able to acquire such a favored position. Unless closely and wisely regulated to harmonize the statutory responsibilities above, this unequal position could result in an overall deterioration in public communications services. The approach we took on rates was a consequent corollary of these considerations, and does not, of course, preclude the establishment of satellite rates, as distinguished from a composite rate, where in the public interest.

Part III. Suggested Procedural Revisions

9. The parties have filed petitions for reconsideration and clarification in this proceeding concerned with the lack of formalized procedures to be followed by Comsat in requesting authorization to serve directly non-carrier entities. As to the case of procedure with respect to direct service to the Government, this matter is discussed in par. 6, <u>supra</u>. With respect to RCAC's contentions, we believe that no revisions are called for at this time, in light of the policies established in our prior decision and in this Memorandum Opinion and in light of the fact that the Commission receives regular monthly reports of foreign negotiations in this area. Further experience is necessary to enable the Commission to determine what, if any, changes are required. The Commission will remain cognizant of the petitioners' contentions in this regard and reassess the procedures now established from time to time in light of experience gained.

10. ACCORDINGLY, IT IS ORDERED, This 1st day of February, 1967, that the Petitions for Reconsideration cited above, and the replies and responses thereto, are granted to the extent set forth above in paragraph 6 and are otherwise denied.

FEDERAL COMMUNICATIONS COMMISSION

Ben F. Waple Secretary

Released: Fabruary 3, 1967

Department of Justice Washington

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LEGAL ADVISER

Mr. Leonard C. Meeker Legal Adviser Department of State Washington, D. C.

APR 3 0 1969

DEPARTMENT OF STATE

Dear Mr. Meeker:

This responds to your letter of February 18, 1969, in which you have asked for our opinion on two questions concerning the authority of the National Aeronautics and Space Administration (NASA) to provide launch services to a foreign government for a domestic communications satellite system. 'Your questions are:

- "Under existing domestic law is there any legal obstacle or impediment to the provision of launch services by the National Aeronautics and Space Administration to a foreign government having a foreign operational domestic communications satellite system?
- (2)

"If NASA has authority to provide such services under our law may it do so independently of the Communications Satellite Corporation, whether acting as an independent United States corporation or as an agent for Intelsat?"

Although not specifically so stated in your letter, I understand your questions assume that such launch services would be provided on a 100% reimbursable basis. In these circumstances, it is our opinion that (1) there is no legal impediment to the provision of launch services by NASA if the President should direct such action; and (2) that launch services pursuant to such Presidential directive may be furnished independently of the Communications Satellite Corporation (Comsat). We have considered the legal memoranda submitted by NASA and Comsat concerning these questions. Those memoranda discuss NASA's authority to engage generally in activities of a purely operational nature. No opinion is expressed herein on that issue because we find sufficient specific authority in the pertinent legislation to dispose of the questions presented without reaching the broader questions discussed by NASA and Comsat.

The determination of the authority of NASA to provide launch services for foreign operational domestic communications satellite systems calls for construction of the National Aeronautics and Space Act of 1958, 72 Stat. 426, as amended, 42 U.S.C. 2451 et seq. ("Space Act") and the Communications Satellite Act of 1962, 76 Stat. 419, 47. U.S.C. 701 et seq. ("CSA").

I.

The Space Act provides, in § 102(c)(42 U.S.C. 2451(c)), that -

"The aeronautical and space activities of the United States shall be conducted so as to contribute materially to one or more of the following objectives: * * *

(7) Cooperation by the United States with other nations or groups of nations in work done pursuant to this Act and of the peaceful application of the results thereof . . ."

Section 205 (42 U.S.C. 2475) provides that:

"The [National Aeronautics and Space] Administration, under the foreign policy guidance of the President, may engage in a program of international cooperation in work done pursuant to this Act, and in the peaceful application of the results thereof, pursuant to agreements made by the President with the advice and consent of the Senate." The quoted provisions constitute a clear mandate for NASA to engage in international cooperation, not only in research, but also in the application of the results of aeronautical and space activities. 1/ The legislative history of § 205 makes it clear that such cooperation is to be under the guidance of the President. 2/ The only question as to NASA's authority under this section is whether such international cooperation may only be carried out pursuant to agreements made by the President with the advice and consent of the Senate.

President Eisenhower stated with respect to § 205 at the time he signed the Space Act that he did not construe that section as prescribing the only permissible form of international cooperation:

"The new Act contains one provision that requires comment. Section 205 authorizes cooperation with other nations and groups of nations in work done pursuant to the Act and in the peaceful application of the results of such work, pursuant to international agreements entered into by the President with the advice and consent of the Senate. I regard this section merely as recognizing that international treaties may be made

1/ There is also some evidence that § 203(b)(6), 42 U.S.C. 2473(b)(6), which authorizes NASA to cooperate with other government and public and private agencies was intended to include foreign governments. See H. Rep. No. 1770, 85th Cong., 2d Sess. p. 9 (referring to the predecessor paragraph 302(a)(6) in an earlier bill).

2/ The section that eventually became § 205 as it was first passed by the House provided that international cooperation should be "under the foreign policy guidance of the State Department." H. Rep. No. 1770, 85th Cong., 2d Sess. p. 25. The Conference Report (H. Rep. No. 2166, 85th Cong., 2d Sess. p. 21) states that the conferees adopted a revised version "specifying that the Administration would act under the foreign policy guidance of the President rather than the State Department." in this field, and as not precluding, in appropriate cases, less formal arrangements for cooperation. To construe the section otherwise would raise substantial constitutional questions." Press Release of July 29, 1958, Public Papers of the Presidents of the United States: Dwight David Eisenhower 1958, par. 185, p. 573.

In addition to this ground for not holding agreements with the advice and consent of the Senate to be necessary for international cooperation in all cases, Congress has subsequently provided detailed guidance for purposes of international cooperation by the United States with respect to communications satellites. The Communications Satellite Act of 1962 (76 Stat. 419, 47 U.S.C. 701 et seq. (CSA)) sets forth the applicable policy objectives and limitations on executive actions, and clearly does not require that such international cooperation be limited to agreements entered into with the advice and consent of the Senate. The meaning of section 205 of the Space Act must be construed in the light of this subsequent, and definitive, legislation on the subject of international cooperation by the United States in the field of communications satellites.

The Communications Satellite Act provides in § 102(a) and (b) (47 U.S.C. 701(a) and (b)) that "it is the policy of the United States to establish, in conjunction and in cooperation with other countries . . . a commercial communications satellite system as part of an improved global communications network . . ." and that "in effectuating this program care and attention will be directed . . . toward efficient and economic use of the electromagnetic frequency spectrum. . .".

Section 201(a) (47 U.S.C. 721(a)) directs that, in order to achieve the objectives and carry out the purposes of that Act, the President shall --

- 4 -

"(3) . . . coordinate the activities of governmental agencies with responsibilities in the field of telecommunication, so as to insure that there is full and effective compliance at all times with the policies set forth in this Act;

"(4) exercise such supervision over relationships of the Corporation [Comsat] with foreign governments or entities or with international bodies as may be appropriate to assure that such relationships shall be consistent with the national interest and the foreign policy of the United States;

"(5) insure that timely arrangements are made under which there can be foreign participation in the establishment and use of a communications satellite system; ...

"(7) so exercise his authority as to help obtain coordinated and efficient use of the electromagnetic spectrum and the technical compatibility of the system with existing communications facilities both in the United States and abroad."

Although the CSA was enacted for the purpose of establishing an international communications satellite system, the issues raised by any proposal for United States cooperation in the establishment of a foreign communications satellite system are inseparable from those relating to the success of the international system "as part of an improved global communications network."

The CSA is a very broad mandate to establish a global network of satellite communications on the basis of international agreements to be negotiated in the future. When the CSA was enacted it was generally believed that for both technical and economic reasons any communications satellite system would be international in character, and that duplicate systems would present serious problems of

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economic feasibility and technical interference in the use of the electromagnetic spectrum. 3/ While it was anticipated that communications satellites might also be used for domestic communications, the feasibility of separate systems for this purpose was not considered a likely prospect for the near future. Congress could not and did not attempt to foresee what specific organizational form domestic communications by satellite would have in relation to international communications. It did, however, make clear the objective of the United States that an international communications satellite system be established soon, and on the basis of international agreement that would protect the system from technical interference in the use of the electromagnetic spectrum as well as uneconomical competition with competing systems. To these ends, the Act authorized the President, among other things, to insure that arrangements be made for foreign participation in the system and to use his authority to obtain coordinated and efficient use of the electromagnetic spectrum.

Whether, and to what extent, domestic communications satellite systems established by other nations should be integrated with or operate separately from the international system is a question that is inextricably related to the issues involved in the establishment and operation of the international system. The authority to determine the U.S. position and to enter into agreements dealing with such questions must be deemed included within the broad authority conferred upon the President by the CSA.

The broad range of possible forms of international cooperation intended to be made possible by the CSA include the conclusion of international arrangements through

3/ See, e.g., S. Rep. No. 1584, 87th Cong., 2d Sess. (1962) p. 8; Hearings before the House Committee on Interstate and Foreign Commerce on H.R. 10115 and H.R. 10138, 87th Cong., 2d Sess., part 2, p. 422 (1962).

- 6 -

less formal devices than a treaty, as exemplified by the various agreements on which the Intelsat system is based. 4/

The clear legislative intention of the CSA is to vest in the President control of the activities of NASA and other government agencies, as well as of Comsat, when engaging in programs of international cooperation in satellite communications. I therefore conclude that the only requirement of domestic law that must be satisfied before NASA may provide reimbursable launching services for a foreign operational domestic communications satellite system is the specific approval of the President.

II.

The foregoing analysis also provides the answer to your second question. Since the authority for NASA to provide such launch services is to be found (a) in NASA's general authority under the Space Act, and (b) through the approval of the President under his authority in both § 205 of the Space Act and § 201(a) of the CSA, I can find no requirement that Comsat be involved in any way in the provision of such services. 5/

4/ The Intelsat system is governed by three separate agreements. The International Telecommunications Satellite Consortium of August 20, 1964 (TIAS 5646) is an intergovernmental (executive) agreement. In addition, a "Special Agreement" (also TIAS 5646) is an agreement between the operating entities, including Comsat. A separate arbitration agreement was concluded subsequently between these operating entities.

5/ Section 201(b)(5) of the CSA (47 U.S.C. 721(b)(5)) which directs NASA to furnish reimbursable launch services to Comsat, is not inconsistent with this conclusion. That section is simply a direction making it mandatory that NASA provide such services. See, e.g., (Cont'd.)

- 7 -

I trust that the foregoing answers your questions.

Sincerely,

William H. Rehnquist Assistant Attorney General Office of Legal Counsel

5/ (Cont'd.) testimony of NASA Administrator James E. Webb in hearings before the Senate Commerce Committee on S. 2814, 87th Cong., 2d Sess., p. 143, and before the House Commerce Committee in hearings on H.R. 10115 and H.R. 10138, Pt. 2, pp. 608-9. There is no indication, either in the CSA, or in its legislative history, that section 201(b)(5) was intended as a limitation on the specific form of arrangements that might be negotiated for a global network of satellite communications. Indeed, section 305(a)(1) expressly recognizes that Comsat's ownership interest in an international system may be either by itself "or in conjunction with foreign governments or business entities."

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SUGGESTED STATEMENT ON DOMESTIC COMMUNICATIONS SATELLITE

Since our economy and our society is increasingly dependent upon the transmission and processing of information, it is important that we encourage experiments with new forms of communication. Although we are increasingly tied to the rest of the world by communications satellites, institutional obstacles have kept us from exploring the existing possibilities for domestic use of satellite communications. Therefore, I will shortly recommend organizational and economic proposals for the establishment of an experimental domestic satellite project that will let us learn first hand what can be achieved. · MEMORANDUM

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WASHINGTON

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		Persons outside Government concerned with Telecommunications Task Force Report	
	Date of Meeting	Industry	
A T & T	4/9/69	Ed Crosland, V.P., Federal Relations, N.Y. 195 Broadway, NYC 10007	(212) 393-1000
		Ben Oliver, V.P., Government Operations, D.C. Ben Givens, Asst. V.P., Federal Relations, D.C. 2055 L Street, N.W., D. C. 20036	(202) 466-4121
COMSAT	4/14/69	General James McCormack, Chairman Joseph Charyk, President	(202) 554-6020
		David Acheson, General Counsel 950 L'Enfant Plaza, Washington, D. C. 20024	÷ 1
General Electric	5/8/69	Richard Gifford, Gen. Mgr. Raymond Baker Mountain View Road, Lynchburg, Va. 24502	(703) VI 6-7311, x. 486
	4/22/69	Don R. Rodgers, Mgr., Missile & Space Field Operations Don Atkinson, Mgr. Aerospace Market Development 777 14th Street N. W. Washington D. C. 20005	(202) EX 3-3600
		Bernard White, Missile and Space Division King of Prussia, Pa. 19406	(215) 962-4111
General Telephone & Electronics		Theodore F. Brophy, V.P. and General Counsel Jim Clerkin, V. P. Operations	(212) 551-1000
		Gaylord Horton Suite 900, 1120 Connecticut Avenue, D.C. 20036	(202) FE 7-6600

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Hughes Aircraft	5/2/69	 Dr. A.D. Wheelon, V.P. Engineering Bldg. 1, M.S. A193, Culver City, California 90230 Mr. Paul Visher, Associate Division Manager, Space Systems Division, Bldg. 366, M.S. A1260, 	(213) 391-0711, x 3770
		 P.O. Box 92919, Los Angeles, California. 90009 Mr. C. (Clell) H. McKinney, NASA & Commercial Communications Activities 1875 Connecticut Ave., Washington, D. C. 20009 	(202) 234-9300
IBM	4/29/69	Robert King, Government Relations Consultant, D.C. George Hallgren, Federal Special Activities Representative Jack Melick, Data Processing Division, D. C. 1111 Connecticut Ave. Washington D. C. 20036	(202) 333-6700, \times 7391 \times 7108 \times 7035
		Fred Warden, Communications Policy Directorate Old Orchard Road, Armonk, N.Y. 10504	(914) 765-1900, x 2241
IT&T	4/8/69	Ted Westfall, Executive V.P. 320 Park Avenue, N.Y., N.Y. 10022	(212) PL 2-6000
		Joseph Gancie, V.P., ITT World Communications John Ryan, Deputy Director, ITT World Communications 1707 L Street, N. W., Washington, D. C. 20036	(202) 296-6200
RCA Global	4/14/69	Howard Hawkins, President 30 Rockefeller Plaza, NYC 10020	(212) 363-4200
Communications		Leonard Tuft, V.P. 1725 K Street, N.W., Washington, D. C. 20006	(202) 337-8500
Sperry Rand Corporat	tion	W. L. Barrow, V. P. for Research, Development & Engineering	(212) 956-2121
		Herbert Harris, 1290 Avenue of the Americas between 51st and 52nd Streets, NYC 10019	

2.

Industry (Continued)

Western Union International	4/30/69	 E. A. Gallagher, President R. E. Conn, Senior V.P., Law & Administration Tom S. Greenish, Executive V.P. 26 Broadway, NYC 10004 	(212) 363-6400
		Henry Catucci, V.P. 521 12th Street, N.W. Washington, D. C.	(202) 638-6724
Western Union Telegraph Co.	4/18/69	Earl Hilburn, Executive Vice President 60 Hudson Street, NYC 10013	(212) 577-4321
		Richard Callaghan, V.P., Congressional Liaison Room 374, National Press, Bldg., Wash, D. C. 20004	(202) 628-8868

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American Advertising Federation of N.Y.		Howard H. Bell, President 1225 Connecticut Ave., Washington, D.C. 20036	(202) 659-1800
Association of Maximur Service Telecasters	n	Lester Lindow, Executive Director 1735 DeSales St., N.W., Washington, D. C.	(202) 347-5412
Electronic Industries Association		George Butler, President, 2001 I Street, N.W., Washington, D. C. 20006	(202) 659-2200
National Association of Broadcasters	4/9/69	Vincent Wasilewski, President Grover Cobb, Chairman of the Board 1771 N Street, N. W., Washington, D. C.	(202) 293-3516
National Cable Tele- vision Assoc., Inc.	6/11/69	Frederick W. Ford, President 1634 I Street, N.W., Washington, D.C. 20006	(202) 347-3440
National Educational Television	4/23/69	James Karayn, Washington Bureau Chief 1619 Massachusetts Ave, N.W., Washington, D.C. 20036	(202) 483-6367
Radio Advertising Bureau		Miles David, President 116 E. 55th St., NYC	(212) MU 8-4020
Television Bureau of Advertising, Inc.		Norman Cash, President 1 Rockefeller Plaza, NYC	(212) PL 7-9420
United Utilities, Inc.		Paul Hinson, President 1700 K St., N.W., Washington, D. C.	(202) 659-4600
United States Independe Telephone Companies Association	nt	Clyde Sautters, Govt. Communications Coordinator Adm. William C. Mott, Executive Vice President 425 Pennsylvania Avenue, N. W. Washington, D. C.	(202) 783-5300

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Institutions

Brookings Institution		William Capron 1775 Massachusetts Ave, N.W., Washington, D. C.	(202) HU 3-8919
Carnegie Corporation of New York		Alan Pifer 437 Madison Avenue, NYC	(212) 753-3100
Ford Foundation	4/25/69	McGeorge Bundy, President Paul Laskin, Task Force Contact 320 East 43rd St., NYC 10017	(212) 573-5000

Labor

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American Federation of Television & Radio Artists		Vicki Viola, NYC 724 5th Ave, NYC	(212) CO 5-3267
Communications Workers of America	4/9/69	Joseph A. Beirne, President Louis Knecht, Assistant to the President John Morgan, Administrative Assistant 1925 K Street, N.W., Washington, D. C. 20006	(202) FE 7-7711
International Brother- hood of Electrical Workers	4/16/69	 Al Hardy, Director of Radio, TV & Recording Division Lawrence Rimshaw, Business Manager for Local Union 1200 1200 15th St., N.W., Washington, D.C. 20005 	(202) CO 5-8040
National Association 4/14/69 of Broadcast Employees & Technicians (Chicago)		Clifford Gorsuch, Regional Director J. F. Donley, Regional V.P. of the Union (NBC) 4530 Connecticut Ave., Washington, D. C. 20008 Albert Recht, Vice President of local union (same address) James Harvey, ABC, International V.P.	(202) 244-7527
		Timothy J. O'Sullivan, President, Hollywood, Calif. 606, North Larchmont, Los Angeles, Calif.	(213) 464-9138

Technical Groups

Joint Technical Advisory Committee of Electrical & Electronic Engineers & the Electronics Industry Association

· · · ·

5/27/69 Tele-Sciences Corp oration

John M. Kenn, Secretary

345 E. 47th St., NYC

Fred W. Morris, President 9315 Holly Oak Court, Washington, D.C. 20034 (212) PL 2-6800

(202) 469-6034

COMMUNICATIONS SATELLITE CORPORATION

ROBERT & BUTTON The Special Assistant to the Chairman

May 7, 1969

Dear Tom:

1 7 1

Attached is an intra-office handy summary which might be of use to you in considering the domestic satellite matter.

Sincerely,

atc.

Dr. Clay T. Whitehead Staff Assistant to the President Room 103 Executive Office Building Washington, D.C. 20500

PRECIS OF RECENT FILINGS IN FCC DOMESTIC SATELLITE PROCEEDING

WUI favors a single, carrier-owned, multipurpose domestic system which WUI would use for taking international traffic to and between its gateway centers. It would like to participate in the ownership and operation of the system.

ABC continues to advocate a separate broadcast system and to oppose Comsat's pilot program proposal on the basis that, if such a program is needed, an unbiased outfit such as NASA should run the show.

The NAM says that a decision of the subject has been delayed long enough, that GE's submission is excellent, and that industrial and commercial organizations should have the freedom of choice to take satellite service from Comsat, the common carriers, or other authorized means.

ITT repeats its position that, although the law permits the authorization of non-common carriers to establish domestic satellite facilities, the Commission should only grant authority to one or more existing common carriers thereby making possible a composite rate structure.

The Aerospace Industries Ass'n of America, Inc., urges the Commission to act on any proposal for domestic service since the new facilities will either directly or indirectly relieve what they consider to be a severe shortage of domestic facilities.

GT&E says that Comsat should own the space segment and Comsat, the carriers or both should own the earth segment of a domestic system. As to the GE filing, GT&E says that it promises much and gives little. GE assumes an earth station technology that is not now in existence, gives exaggerated market projections for newly named services (Telemail) which are really not new at all (TWX), and wrongfully overlooks or misrepresents the values and methods of operation of the existing switching network.

AT&T reiterates its opposition to specialized satellite systems as being wasteful of frequency spectrum and orbital space and concludes that the GE project has not been thoroughly thought out as demonstrated by the various errors, omissions and misunderstandings in the proposal including:

> National policy does not necessarily favor competition in the common carrier field despite GE's conclusion to the contrary. This is especially true in the communications satellite area where Comsat is a carriers' carrier.

It is technically and economically unsound to create separate systems for record and voice services.

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The "new" services described by GE are not new.

GE neglected to include estimates of local distribution and terminal equipment costs which constitute the bulk of communications system costs.

GE does not understand the manner in which the nationwide switching network operates.

Terrestrial facility costs are decreasing and will continue to decrease so that GE is wrong in comparing 1980 satellite system costs per service unit with unit costs via todays terrestrial facilities.

GE's proposal has no restoration capability.

The GE market projections appear inflated in various respects.

Most of the traffic GE would hope to obtain is of a short-haul nature and, "Our studies have demonstrated that the economic 'crossover' point at which satellites, based on the current state of the art, become economically attractive in contrast to terrestrial facilities is in excess of 1,000 miles."

Western Union disagrees with GE's market and cost projections as well as with the GE suggestion that it might be a good idea to create a new common carrier to handle the domestic satellite business. GE doesn't understand how the terrestrial switching network operates. Since the major uncertainty about satellite service is the economics and not the technology, Western Union favors the prompt initiation of a common carrier system (the law does not permit non-common carrier systems) which would form the foundation for further expansion and development if and when that proves desirable. Before a permanent system is realized, the important underlying questions concerning ownership and control should be answered.

NBC still wants a dedicated TV system but believes it best under the circumstances to get a demonstration program under way perhaps with the ATS or INTELSAT I and II satellites. To get going, NBC thinks a conference of all interested parties would somehow be useful. (Called by Consat)

MCI likes GE's filing, particularly the concept that authorizing a new common carrier to provide the service might stimulate competition.

Special Agent Routson of TVC of California, Inc. and Com Sumers, Inc., may be the same guy I talked with on the phone who wanted to hook up by encoded and decoded TV signals all the bars in the country. The filing is not that clear, however.

P. M. Andersen

March 5, 1969 Walter Hinchman

Regional Satellites

The term "regional satellite" is subject to several different interpretations. In the strict technical sense, all satellites are "regional" in that they are visible to only a limited region of the earth's surface. Thus to some the existing INTELSAT system of global satellites is considered to be in fact three regional satellites, serving, respectively, the Atlantic, Pacific, and Indian Ocean basins. Various suggestions have been made for restructuring INTELSAT ownership in accord with this particular concept of regional satellites.

A second interpretation of the term regional is that of a satellite serving the joint needs of a particular grouping of nations irrespective of their geographic positions. Thus, a satellite linking France with her former colonies and present associates in Africa and North/South America has been suggested as one possible "regional" satellite.

In the context of this paper, regional has yet another -primarily technical and economic -- meaning. In short, a regional satellite as here defined is simply one which is optimally located and designed to provide primarily <u>internal</u> communication services from a single land mass -- or major segment thereof -- or an insular group. Thus, a satellite
serving solely U.S. domestic needs would be termed regional in this context, as would those serving U.S./Canada, or South America, or Europe, or other similar areas.

No one can forecast at this time what the "optimum" number, location, and characteristics of communication satellites will be -- or what variety of communications needs they will best However, one can recognize certain fundamental technical, serve. and economic considerations which are bound to affect rather strongly the natural development of satellite services, given a relatively objective policy and regulatory framework. The purpose of this paper is to set forth some of those considerations, in terms of the "regional" satellite concept noted above, in the hope that these may lead to informed -- and above all, flexible -- policy positions on the part of the U.S. in the present INTELSAT Conference. As a point of departure, it may be noted that the author does not consider prior U.S. approaches to the regional satellite question as either enlightened or likely to be productive.

It is frequently asserted that the cost of providing a communications circuit via satellite is independent of distance. This assertion has led some to believe that all satellites should serve as wide a geographic area as possible, namely, the

-2-

roughly 40% of the globe visible from a spot in the geostationary orbital belt. This belief may lead in turn to the further notion that all satellites must be "international" in the broadest possible sense, and therefore that any form of "satellite regionalism" is detrimental and to be resisted.

The facts regarding satellite communications are quite different from the above concept. While it is true that the cost per circuit is constant irrespective of distance within a <u>particular satellite/earth station configuration</u>, this cost can be drastically altered by the choice of configuration adopted. Specifically, a satellite employing very narrow antenna beams capable of concentrating the total satellite power -- and radio frequency bandwidth -- on a small geographic area can provide communication circuits at a small fraction of the unit cost of a global (i.e., earth-subtending) satellite system. This is so because the size and complexity of the earth station transmitting/ receiving equipment (including antennas) needed to derive a specified number of circuits may be significantly reduced when working with such "spotlight" satellites.

Another assertion frequently voiced is that so-called "global" satellites will be capable of providing "regional" (i.e. land-mass) services more economically than the regional satellites described above because of their large "economies of scale." This argument again ignores several fundamental technical factors affecting

-3-

both the <u>operational effectiveness</u>, <u>operating constraints</u>, and <u>cost-effectiveness</u> of satellite communications:

1. Operational Effectiveness

A primary objective of global (i.e. transoceanic or intercontinental) satellites is to serve a large number of nations separated by large, oceanic reaches; thus, the optimum location for such satellites is above the mid-ocean areas, where they are visible to only a fraction of the total land mass of any continent. By contrast, to be operationally effective in serving the internal communication needs of a given land mass or segment thereof, satellites must be visible from any location within that mass. For example, since neither the Pacific nor Atlantic INTELSAT satellite is visible to more than 50% of either the U.S., Canada, or Mexico, the internal communications needs of North America could not be served effectively by these satellites. Conversely, a satellite which sought to serve the Asian land mass (e.g. USSR) most effectively would not be optimally situated for "international" traffic in the Indian Ocean area.

2. Operating Constraints

The necessity of using electromagnetic radiations (radio) as the mechanism for transferring messages imposes several operating constraints on communication satellites.

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First, the large number of claimants for use of the radio spectrum has dictated that satellites be allocated only a finite amount of this valuable resource; this limits the total communications capacity which can be provided through a single satellite. Second, the existing spectrum allocations for communication satellites are shared with terrestrial radio relay services, due to this same problem of shortage; this creates the prospect of mutual interference between these services, which is more likely to occur when satellites are displaced significantly from the geographic area being served due to the lower elevation angles this entails. Third, radio waves of the frequency range currently allocated to satellites suffer differing degrees of spreading and absorption loss depending on the angle of arrival at (or departure from) the 'earth's surface; thus, signals from satellites situated at the same longitude as the geographic area being served suffer less loss than 'from those displaced in longitude.

The combined effect of the above constraints is that satellites situated near the same longitude as the geographic area being served can provide a given level of service at lower costs, and with less probability of mutual interference with terrestrial radio relay systems, than those removed in longitude. Furthermore, a many-satellite array occupying the geostationary

-5-

belt is inherently capable of providing much greater overall communications capacity from a given spectrum allocation than a few-satellite system, due to the multiplicative effect of spectrum re-use. This latter advantage may be further enhanced by the use of narrow-beam satellite antennas, which will permit a limited amount of multiple spectrum use from even a single orbital position. Since such narrow-beam antennas provide only regional coverage, the regional satellite concept is particularly germane to the question of effective spectrum use.

3. Cost-Effectiveness

In order to serve any communications need, satellites must be cost-competitive with the various terrestrial alternative communication modes. For global or transoceanic services, the primary alternative is the submarine cable, a facility with limited flexibility (e.g. no video or other wide-band capability) and fairly high cost. Thus, global satellites can afford to radiate their power inefficiently into the oceans in order to expand their coverage, while remaining cost-competitive with submarine cables.

For land-mass communications, satellites are faced with considerably more competitive terrestrial alternatives, including microwave radio relays, open-wire, coaxial cables, and

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tropospheric scatter systems. This does <u>not</u> mean that satellites will necessarily be more costly than these terrestrial systems -indeed various studies indicate they may be cost-competitive for some services within the highly-developed U.S. communications system, which should render them highly attractive in lessdeveloped areas. However, it <u>does</u> mean that all the economies from limiting the satellite coverage, using the optimum geostationary orbit location, reducing the size and complexity of earth stations, etc., may be required.

Summary and Conclusions

The extensive deployment and use of "regional" (i.e. landmass oriented, limited geographic coverage) satellites appears a most likely course of development for satellite communication services, for a variety of purely technical, operational, and economic reasons. Indeed, since most communications traffic tends to be within major land masses rather than between or among them, it is reasonable to expect that "regional" satellites will in the near future carry more traffic than so-called "global" satellites, given a receptive policy and regulatory environment. Global satellites will not be replaced nor made obsolete by regional satellites, but will serve a different (i.e. primarily transoceanic) market.

-7-

To the extent that INTELSAT either is or could be motivated to design, produce, and operate such regional satellites -- and to price their services according to individual or appropriately weighted costs -- economies could accrue to all users through common research, development, procurement, and operating activities. However, it must be recognized that neither the existing nor proposed INTELSAT arrangements provide an effective incentive for INTELSAT to engage in such activities. A basic principle embodied in these arrangements is that neither INTELSAT as an entity nor any of its members may derive a profit from the provision of satellite technology or services to other members. Thus, the entities which effectively control INTELSAT (e.g. COMSAT, and the European telecommunications ministries) have little reason, either collectively or individually, to develop such regional satellites within the INTELSAT framework. On the other hand, the provision of terrestrial technology and services is not so contrained by international agreement. Thus, there is an effective incentive to both U.S. and European interests to market terrestrial systems throughout the world, irrespective of their cost-effectiveness or viability vis-a-vis regional satellite systems. So long as this combination of satellite dis-incentives and terrestrial incentives prevails, continued uneconomic development of terrestrial facilities such as the

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ITN microwave network in South America may be expected. The social and economic consequences of this situation in areas such as the U.S. or Europe is difficult to assess, given the highly developed terrestrial networks and many alternative technologies available in those areas. In developing areas of the world, it seems more apparent that economic and cultural development may be seriously hampered by a continuing lack of the effective, low-cost telecommunication services which regional satellites could provide.

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February 19, 1969

Mr. Abbott Washburn Washburn, Stringer Associates, Inc. 4622 Broad Branch Road, N.W. Washington, D. C. 20008

Dear Abbott:

Thank you for your letter of January 31 in regard to the domestic satellite project. I have sent a copy of your correspondence to Robert Ellsworth, who is working in this area. I am sure it will receive very careful considerationl

Sincerely,

Martin Anderson Special Assistant to the President

WASHBURN, STRINGER ASSOCIATES, INC. 4822 BROAD BRANCH ROAD, N. W. WASHINGTON, D. C. 20008 362-8494

ABBOTT WASHBURN

January 31, 1969

CALLE RIO SENA NO.63-A MEXICO 5, D. F., MEXICO PHONE: 14-55-21

Dear Martin,

With respect to recommendation number 1 on page 2 of my summary of President Johnson's Telecommunications Task Force Report (attached) - namely the domestic satellite pilot project - I understand that Chairman Hyde and the FCC are prepared to give the nod to going ahead on this without delay, provided the White House has no objection.

In the preceding Administration they would have looked to DeVier Pierson, Associate Special Counsel in the White House, to convey such clearance-or perhaps to the Director of Telecommunications Management in OEP, General O'Connell.

The pilot operation was discussed as far back as September 1966. It was deferred again in August 1967 when the Eugene Rostow group was set up by LBJ to study the whole telecommunications field.

Given FCC's blessing, there will be little opposition. It is one of the more or less non-controversial recommendations.

With best regards,

Sincerely

Abbott Washburn

Professor Martin Anderson Special Assistant to the President The White House Washington, D. C. 20500



WASHBURN, STRINGER ASSOCIATES, INC. 4622 BROAD BRANCH ROAD, N. W. WASHINGTON, D. C. 20008 302-8494

ABBOTT WASHBURN

December 28, 1968

CALLE RIO SENA NO.63-A MEXICO 5, D. F., MEXICO PHONE: 14-55-21

Dear Henry,

Again I apologize for the length of this summary. However, the <u>Report on Telecommunications</u> is 450 pages long and to give a fair notion of its major thrusts required more than 2 or 3 pages.

I know I don't have to sell you on the vital importance of communications. Mankind's future progress, here and abroad, is intimately bound up with communications. This Report represents 15 months of solid effort by capable people. Some of the recommendations are far-reaching and bold. Most experts, in and out of government, agree that reforms are overdue, the problems acute. Therefore, the new Nixon Administration can profit from this good groundwork by getting together a high-level group of 4 or 5 experts of its own to go through the Report and report back their recommendations. These would then be considered by President Nixon-leading toward his recommendations to the Congress in this field and also toward appropriate Executive Branch decisions and actions.

If I can be of any further help, please let me know.

Sincerely,

Abbott Washburn

The Honorable Henry Loomis 1425 4th St., SW Washington, D. C. 20024

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Summary of Report of President Johnson's

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Task Force on Telecommunications

In a message to Congress on August 14, 1967, the President called for a review of our past activities in the field of communications and announced the appointment of a Task Force "to make a comprehensive study of communications policy." Fifteen agencies of the Federal government were represented on the Task Force (list of members attached).

The Task Force's Report was delivered to the President in early December, 1968, by its Chairman, Eugene V. Rostow, Under Secretary of State for Political Affairs. The White House has not yet released the 450-page Report, or any part of it, publicly. Whether it does or not, any implementation will be up to the new Administration.

The Report's recommendations, if adopted, would result in the most far-reaching changes since passage of the Communications Act of 1934, the basic blueprint for Federal involvement in communications. The purpose is to bring our national policies in this field up-to-date with the technological changes that have taken place since 1934, and to provide appropriate and modern government supervision of the communications industry.

There is no question that such an updating has long been needed and that the Task Force, during its 15 months of labor. has done thorough and essential spadework. Certain of its recommendations are sure to become controversial, however, although most leaders in both the industry and government agree <u>in prin-</u> <u>ciple</u> that basic changes are necessary. Of the Report's many recommendations, the following are among the most important:

1. Use of Satellites for Domestic Communications

The use of satellites for domestic communications -- i.e. in broadcasting, telephone service, computer data transmission, etc--would greatly strengthen our U. S. communications network. "Before any firm decision is taken on ownership and other arrangements in the use of satellites domestically," the Report states, "we believe it desirable to have the benefit of a pilot program to provide technological, operational and economic data... Management of this pilot venture should logically be entrusted to Comsat (Communications Satellite Corporation) on the basis of its experience in the satellite field ... Comsat and other potential investors should serve as interim owners of the basic pilot system with no commitment as to ultimate rights to own and operate any such system ... Regulatory arrangements should be established to assure a prompt start and, to the extent feasible, to allow participation by carriers, broadcasters and other users in the ownership of satellite communications ground stations."

-2-

This recommendation is not expected to be particularly controversial despite the fact that it involves so many elements, including AT&T. Western Union, NBC, CBS, ABC, various independent broadcasting stations, Educational-TV, Associated Press, United Press, Comsat, the computer industry, FCC, and various departments of the Federal government. Comsat is willing to undertake it. It will be difficult of accomplishment, nonetheless.

2. Merger of Existing International Communications Facilities into a Single Entity

The most far-reaching, and potentially controversial, re-Commendation of the Task Force is the merger into one privately owned company of all present international transmission facilities: the underseas cables of AT&T, the satellites and ground stations of Comsat, and the terminals and switching stations of the "record" carriers (primarily ITT World Communications, Inc., RCA Communications, Inc., and Western Union International, Inc.)*

"In the near future," the Report states, "the growth in capacity of large-scale transmission facilities [high-capacity underseas cables and communications satellites] will easily provide capacity in excess of foreseeable demand." This will make

The data or "record" carriers, by definition, do not transmit voice (telephone). AT&T, of course, <u>does</u> transmit voice but has been precluded from the data field to protect the weaker "record" carriers from competition.

-3-

effective competition between the different types of international communications very difficult. "The present structure of the industry is based on historical distinctions between voice and data services, and on a separation of modes of transmission, which have led to protective market divisions having little economic or technical justification today."

The Report argues that doing away with the existing fragmented and obsolete structure, by means of the proposed merger, will result in:

- (a) More economical and efficient transmission operations and thus, presumably, reductions in rates. (An example: the elimination of duplicate transmission facilities--e.g. ground and switching stations--with resulting economies in operation.)
- (b) Better balanced investment decisions on whether to lay more cables or launch additional satellites.
 (Under the present fragmented ownership, the individual companies tend to develop vested interests in particular forms of technology.)
- (c) Easier, more effective regulation by the FCC, particularly over rates.
- (d) Prevention of foreign monopolies (owned by foreign governments) from "playing off" one American carrier against another in communications agreements.

-4-

Under the proposal, the present carriers would continue their current services within the United States, competing for the collection of communications which they would then relay to the new company for transmission overseas. The new "single entity" would be a "pipeline" transmitting abroad all the messages of the voice and "record" carriers.

Objections to this recommendation can be expected from some members of Congress (which would have to adjust the antitrust laws). parts of the industry, and other quarters on grounds that this represents Government fostering of a monopoly that will inhibit competition in international communications. The Task Force, on the other hand, reasons that there is no longer any real competition between the "record" carriers since they all use the same trans-oceanic facilities, leasing their channels from AT&T and Comsat. Like it or not, technical and economic considerations are thrusting a monopoly on the transmission portion of the international communications industry, according to the Report.

Gen. David Sarnoff is reported to have commented, "we've got to do something about this international stuff." James McCormack, Chairman and Chief Executive Officer of Comsat, supports "a major overhaul." But some of the established elements of the industry, while agreeing in principle that the time has come for reform, are apt to react: "Sure, the present system is far from

-5-

perfect, but I've got my part of it, I can make a profit, and I'm going to try to keep the status guo if possible."

The major organizations affected by this recommendation are AT&T; RCA; ITT World Communications, Inc; Western Unionr International; Comsat; the Departments of State, Defense, Commerce, Transportation, Justice; the FCC and the Bureau of the Budget.

Most concerned on the Hill are the Commerce Committees of both bodies--Senators Magnuson and Pastore on the Senate side and Congressman Harley Staggers, of West Virginia, on the House side. All three legislators have been following the subject closely and in depth.

3. The Establishment of a New Communications Organization or Agency within the Executive Branch

Such a new body is badly needed, in the view of the Task Force, because Government involvement in communications is presently scattered piecemeal among a score of departments, agencies, commissions and committees "without a single focus for the coordination of national communications policy."

Telecommunications traditionally has been viewed as a mission-support function rather than a critical area of public policy in its own right. As a result, we have today in Government "a patchwork pattern of roles and structure," rather than a coherent framework for comprehensive policy-formation and longrange planning.

In February of 1962 President Kennedy attempted to remedy the situation with Executive Order 10995 establishing the position of Director of Telecommunications Management (DTM). The DTM was, and is, charged with coordinating government telecomm munication policies, serving also as Special Assistant to the President for Telecommunications. The Task Force regards this as only a partial answer, however, since the DTM's staff is limited and his area of responsibility circumscribed. "Our studies show that neither the FCC nor the DTM has the resources essential to the satisfactory discharge of the regulatory and Executive Branch responsibilities."

The Task Force envisions an Executive Branch agency staffed with experts in the field: "electronics and systems engineers and physical scientists capable of analyzing the application of technological developments; economists engaging in industry studies and cost-and-demand forecasting; analysts, engineers and lawyers operating in inter-disciplinary teams assessing pricing and investment alternatives and weighing the impact of proposed regulatory schemes."

The new agency would have centralized responsibility for spectrum management. In addition to coordinating communications policy and long-range planking, it would furnish a focus in the areas of procurement, evaluation, research and development.

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It would also provide technical assistance to HEW, HUD, the Labor Department and other departments lacking such capabilities.

The Report finds that FCC, too, needs strengthening. "It is struggling with a host of problems engendered by the rapid advance of telecommunications technology"--while at the same time "coping with the burdensome day-to-day business of administering the regulatory statutes ... It needs increased resources and the assistance of a new Executive Branch organization."

Nevertheless, opposition to this recommendation can be expected from the FCC (though probably informally).

We are told that the DTM, Gen. James O'Connell, who served as Vice Chairman of the Task Force, has filed a lengthy dissent from the Report on a number of points. This may in part account for the fact that President Johnson has thus far said nothing publicly on the subject.

4. Other Recommendations

(a) "Special consideration should be given to the <u>needs of the developing nations</u>, for whose progress modern communications systems are virtually indispensable." Sharing the use of satellites is suggested.

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 (b) "<u>Cable television</u> is a promising avenue to diversity".
 TV, in general, should serve a wider variety of needs, tastes, and interests---rather than today's "rela-

-8-

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tively uniform programs from a limited number of sources."

S we have been some start

(c) INTELSAT (International Telecommunications Satellite Consortium) -- the global communications satellite system in which 63 nations, including the U. S., are now represented -- has been a strikingly successful, complex international undertaking. "We shouldcontinue to develop and perfect the INTELSAT global system." Permanent arrangements for INTELSAT will be negotiated at an international conference to be held in Washington this coming February. President Johnson has named Leonard Marks, former Director of USIA, to head the U. S. delegation at the conference.
(d) "We recommend well-planned experimental television programs designed to help overcome some of the pro-

blems of our urban ghetto dwellers and isolated rural people."

(e) The Report, in numerous places, calls for more research and study. "We were repeatedly struck by the paucity of data relating to the economic characteristics and performance of the telecommunications industry. The field has thus far not generated anything like the amount of policy research that its importance justifies... We therefore urge governmental, foundation, and business support for in-

-9-

creased inter-disciplinary research and training in telecommunications policy in the universities... An institute for communications policy training and research should be developed outside the government."

More research on the impact of TV and Radio is also needed. "We believe that the social and psychological effects of mass communication constitute one of the most important of all fields of research in the years before us, and must be an active focus for sustained "effort. What is at stake is too precious, too fundamental, to be lost through neglect."

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President's Task Force on Communications Policy

- Chairman, Eugene V. Rostow, Under Secretary of State for Political Affairs
- Vice-Chairman, James D. O'Connell, Director of Telecommunications Management, the White House
- Donald G. Agger, Assistant Secretary of Transportation
- J. Joseph Bartlett, Under Secretary of Commerce
- Dean W. Coston, Executive Assistant to the Secretary of Health, Education and Welfare
- Donald Hornig, Director, Office of Science and Technology
- Bolis Horwitz, Assistant Secretary of Defense

Leonard H. Marks,

Director, USIA. (Mr. Marks withdrew from the Task Force in October, 1968 upon his appointment to head our U. S. delegation to the INTELSAT Conference)

Merton J. Peck, Member, President's Council of Economic Advisors

James Reynolds, Under Secretary of Labor

Willis H. Shapley, Associate Deputy Administrator of NASA

Anthony M. Solomon, Assistant Secretary of State for Economic Affairs

Edward C. Welsh, Executive Secretary, National Aeronautics and Space Council Robert C. Wood,

Under Secretary, Department of Housing and Urban Renewal

Edward Zimmerman,

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Assistant Attorney-General, Anti-Trust Division

Charles J. Zwick, Director, Bureau of the Budget

Ex-Officio

Rosel Hyde, Chairman, FCC DeVier Pierson, Associate Special Counsel, The White House

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TELECOMMUNICATIONS ORGANIZATIONAL CHRONOLOGY

- 1922 The Secretary of Commerce formed the Interdepartmental Radio Advisory Committee (IRAC) to allocate frequencies among the federal agencies "to prevent harmful interference."
- 1934 Communications Act set up FCC's licensing and regulatory powers over radio communications, and regulatory powers over common carriers (telephone-telegraph).
- 1951 President Truman launched a series of internal studies of government organization in telecommunications, then created by Executive Order a Telecommunications Advisor to the President. His role: to assist the President on policy and to assign radio frequencies to federal agencies. (IRAC, although formally relegated to an advisory role, continued to play a principal role in the assignment process, and still does.)
- 1958 President Eisenhower transferred functions of Telecommunications Advisor to Office of Civil Defense Mobilization (later Office of Emergency Planning). DTM is still on organization chart under Director of OEP.

1962

By Executive Order JFK set up DTM (Director of Telecommunications Management) making him also a Special Assistant to the President. Gave him authority over Government frequency allocations; responsibility for coordinating telecommunications policies; and delegated to him the President's responsibility under the Communications Satellite Act of 1962 "for promotion and coordination of satellite communications."

1963 - Following the communications fiasco during the Cuban invasion, JFK set up the National Communications System--interconnecting the major existing Government systems.
 (Biggest unit: Defense Communications System, a world-wide complex of DOD communications networks). The Secretary of Defense is Executive Agent of NCS and the head of DCS is Manager of NCS. DTM was given a policy-advisory role.

TODAY -

DTM is submerged on the OEP organization chart. The function is under-budgeted. It lacks adequate personnel. Therefore it is not effective in coordinating policy. The present DTM, General James O'Connell, is considerably frustrated by this situation and is plumping for an upgrading of the activity to give it the necessary clout to function effectively.

The Task Force Report (Chapter IX, page 20) comments:

"In theory, DTM is the focal point for coordination of federal telecommunications policy within the Executive Branch. In actuality the coordinating role is diffused among a multiplicity of committees--some permanent and some <u>ad hoc</u>--interwoven into a complicated web of formal and informal relationships. Many of these units have difficulty responding to coordination."

The Report stresses that there is at present "no centralized responsibility for spectrum management." DTM and IRAC, in point of fact, share responsibility for federal agency use of the spectrum. FCC has responsibility for commercial use of the spectrum. The public interest tends to get lost between the two. The new agency should have <u>overall</u> responsibility for the spectrum in the national welfare, in the view of the Task Force.

"Under existing arrangements, DTM lacks the weight to resist effectively the frequency demands of powerful IRAC members and to conserve government use of spectrum for the benefit of private users... Neither the President nor anyone else (except Congress) can revise the FCC's frequency allocations in the nonfederal sector. No agency, at present, is empowered to effect an equitable and efficient division of the spectrum between the two."

The Task Force clearly feels that the only way to get the function up where it should be is to set up a new agency---comparable perhaps to the Department of Transportation--although they nowhere mention Cabinet-level status. They also assign it many responsibilities in addition to overall spectrum-management, policy coordination, and long-range planning--functions which are considered beyond those of a White House staff

offices:

R&D planning and coordination Evaluation of pilot programs Technical assistance on procurement Technical assistance on new regulatory procedures Personnel development in telecommunication policy And others.

-3-

Its staff of experts (scientists, economists, lawyers, engineers) would have to be large enough to carry out the above tasks. Considerably larger, presumably, than a normal White House staff office.

Had HHH won the election, we are told that the Secretary of Transportation, Alan Boyd, was pushing hard to merge these functions into a new Department of Transportation and Communications. C. R. Smith, Secretary of Commerce, was simultaneously plugging to absorb them into the Commerce Department.

Some experts, among them the present DTM, think that the solution lies in upgrading the office of the DTM, taking it out of OEP, assigning it adequate staff and budget, and giving it real authority (from the President) to act in the public interest in supervising equitable division of the spectrum between Federal and private users.

The Bureau of the Budget is understood to have recently prepared a paper on telecommunications organization.

Domestic satellites

THE WHITE HOUSE

WASHINGTON

May 6, 1969

MEMORANDUM FOR THE RECORD

Section 201 (a) of the Communications Satellite Act seems to give the President substantial authority that may be useful in our domestic satellite activities. In particular, it provides that the President shall coordinate the activities of Government agencies with responsibilities in the field of telecommunications to achieve compliance with the Act, and still exercise his authority to help obtain better use of the spectrum and the technical compatibility of the system with existing communications, both in the United States and abroad.

We should check to find out how these provisions may help us in intervening in the domestic satellite inquiry before the FCC and proposing or directing the kind of experiment we have discussed.

Also need to get a reading on how the Communications Satellite Act may limit what we can do, how it has been interpreted, and the desirability of a Presidentially stated interpretation with respect to domestic satellites or a Presidentially suggested amendment to the Act.

> Clay T. Whitehead Staff Assistant

VARIETY ON July 24, 1969

02

Nixon Will Name Panel To Explore Satellite System Washington, July 23-President

Washington, July 23—President Nixon is planning soon to appoint a group of government officials to study question of a domestic communications satellite system and report back with recommendations within 60 days.

within 60 days. FCC has had the problem for some time, and reportedly has been close to action several times, but now apparently will wait results of the White House study team headed by communications aide Dr. Clay Whitehead. FCC will be invited to observe the meetings of the panel of bureaucrats, to be drawn from agencies that might be affected by a domestic communications satellite system. The White House is known to feel time has come for some kind of decisive action.

decisive action. There are a variety of problems involved with a domestic satellite plan, chief among them being ownership and control. ABC has proposed, for instance, a separate broadcast system that would also carry public broadcasting programs around the country to affiliates free. COMSAT, on the other hand, wants a complete communications package and it wants to extend its international satellite control to the U.S. Business Week July 26, 1969 3/

Regulators

White House gets into the FCC act

In a dramatic shift of regulatory philosophy, the White House has decided to get involved in the forthcoming decision on a domestic communications satellite system. In a surprise memorandum, it notified the Federal Communications Commission, which has responsibility for licensing such a system, that it plans to make a recommendation in 60 days.

Theoretically, the FCC, a quasi-judicial independent agency, could ignore the White House recommendation. But FCC decisions are based on the "public interest," and a statement from the White House—ostensibly representing the thinking of the President—is hard, if not impossible, to disregard. In addition, the President has the power to pick and renominate regulatory commissioners.

White House staffers say they are aware that the action is a break with tradition and intimate that the same procedure will be followed with cases before other regulatory bodies.

The Administration denies that it has lost confidence in the FCC. But White House aides observe that the commission seems incapable of making major decisions involving new technologies. This might indicate that the White House plans to streamline the FCC and the regulatory process in general.

The FCC also has yet to take action ontwo other issues: CATV and computers and their relationship with communications. Both were major issues in the Johnson Administration task force study that took more than a year to complete. No action has yet resulted from that study's recommendations.

Ignored. The White House will not interfere too much with the everyday regulatory agency functions. But it will provide guidelines to help the agencies define and protect the public interest.

Administration sources say that the FCC and some other agencies depend too much on "adversary hearings" between competing industry parties, and then attempt to reach a compromise without really ever giving the public due attention.

In the domestic satellite issue, the White House obviously lacks confidence Corp. to hold meetings with all interested parties. Comsat would have to work out a compromise agreeable to all parties—users such as broadcasters, computer time-sharing concerns, and CATV operations, as well as the existing common carriers led, of course, by American Telephone & Telegraph Corp.

The White House thinks this plan needs more thought. That's why the FCC was asked to hold off until the Administration plan is formulated.

Clay T. Whitehead, the White House aide on communications, is preparing a memorandum to the Secretaries of Commerce and Transportation, the Attorney General, Council of Economic Advisers, the President's science adviser, the director of telecommunications management, and the FCC asking officials to designate staffers to serve on the panel that would write guidelines.

Questions. The White House doesn't know how deep the study will go. There are numerous outstanding issues on the domestic satellite system.

The first is who should own and operate the satellite itself. Comsat is the obvious candidate, but many regulatory matters must be cleared up, such as how to include the investment into the corporation's rate base.

Then there is the question of who should own the ground terminals. The terminals are many times more costly than the satellites, and their owners are able to determine the ultimate users of the system. AT&T would like to own the terminals or at least operate them in partnership with Comsat. But fear of AT&T bigness and near-monopoly causes some to urge ownership by Comsat or the major users of the system, such as the broadcasters.

Debate. Finally, there is a division of opinion over whom the satellite system should serve. One school holds that satellites should be reserved for what are called "special services." A special-service satellite would provide such specific services as links for broadcasters relaying programs from coast to coast, computer hookups, CATV program distribution, and perhaps telemail.

The opposite theory is that the system should merely offer long-haul communications services to all takers. This might compete with AT&T's long lines operation. It's estimated that any link more than 500 mi. or 1,000 mi. in length could economically be served by satellite. Shorter distances would be better served by traditional facilities.

The FCC has been frustrated by the problem for more than five years. Several times in recent months rumors went out that the commission's decision was imminent. Each time, apparently, the White House issued a "hold" order.

TELECOMMUNICATIONS REPORTS

VOLUME THIRTY-FIVE, NO. 31, July 28, 1969

'SMALL WORKING GROUP' TO BE NAMED BY WHITE HOUSE TO STUDY DOMESTIC SATELLITE COMMUNICATIONS QUESTION; HOPES TO COMPLETE JOB IN 60 DAYS

-1-

The prospects of an early decision on the domestic satellite question by the Federal Communications Commission dimmed considerably last week when the White House announced that "a small working group" will take a look at the subject.

In a brief memorandum to FCC Chairman Rosel H. Hyde Tuesday, July 22, White House Staff Assistant Clay T. Whitehead said that "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 specially important.

"To assist the administration in further reviewing this area," Mr. Whitehead continued, "we are establishing a small working group and invite the FCC to participate in any way you deem appropriate.

"Our objective," he said, "will be to formulate within 60 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."

While the concluding sentence seemed to suggest that the White House would not be concerned with the applications now on file with the Commission related to its domestic satellite inquiry, it appeared certain that no final action would be taken by the FCC in this regard while the White House-appointed group is making its own review of the subject of domestic satellites.

There were no further indications as to the membership of the working group, but it was understood that it would include representation from the Office of Telecommunications Management, the Commerce, Justice and Transportation Departments, and some other federal offices in addition to the FCC. The President's Science Adviser and the Council of Economic Advisers were also reported to have been asked to furnish members for the group.

The domestic satellite question has been long pending before the Commission, ever since the American Broadcasting Cos. kicked it off with a proposal in 1965 for its own domestic system. It has been the subject of a lengthy inquiry at the FCC, a subject of a number of Congressional hearings, and also was a main subject for consideration by President Johnson's task force on communications policy. During the August, 1967, to December, 1968, life of the latter, the Commission deferred any action.

THE WASHINGTON POST Wednesday, July 30, 1969

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Review Set Of Domestic Satellite TV

The White House plans to appoint a small inter-agency working committee on a sensitive subject for America's communications industry: domestic satellites.

The issue has been drifting around Government since 1965 when the American Broadcasting Co. first asked that it be allowed to build and operate a domestic system to transmit television programs. With ABC's proposal as a

stimulus, the Federal Communications Commission opened a wide inquiry into domestic satellites. The FCC's call for competing ideas elicited a long list of suggestions from many sources, including the 'Ford Foundation (which wanted to see domestic satellites used for public television), the American Telephone and Telegraph Co., and the Communi-

cations Satellite Corp. The FCC has yet to decide the case, and key questionsownership of the satellites for example-remain unanswered.

The new White House study group will add slightly to the delay. "Our objective will be, to formulate within sixty days whatever Administration suggestions or comments may be appropriate," the White House told the FCC in a short memorandum last week.

Though the FCC acts as an independent regulatory agency, it can receive advice from the Executive Branch when broaching major new areas in national communications policy.



Star Business Writer

The Federal Communications Commission, at the request of the White House, decided today to hold up for at least 60 days any decision to set up a domestic communications satellite system.

The delay will give the Nixon administration a chance to study all sides in the long-pending case and make some recommendations to the FCC.

FCC Chairman Rosel H. Hyde denied that the White House request constitutes any compromise of recent orders to presidential staff members to keep out of the decision-making processes of the independent regulatory agencies.

"This is somewhat different than routine" cases in which the FCC has the sole responsibility, Hyde said. "The satellite act places a very significant activity on the executive department as well as on us," he added, and "a bit of liaison is appropriate because of the unique nature" of the matter, he said.

Hyde said "we think the matter should move along as expeditiously as possible, but we still think the new administration ought to have at least a little time to consider the matter."

The domestic satellite issue has been before the FCC at least three years. The commission has heard a number of proposals urging various systems be set up. Most recently, a task force appointed by President Johnson urged the FCC to set up an interim satellite system with Communications Satellite Corp. as manager.

Hyde said that "had it not been for the task force study it (a decision) would have been out before the end of that." The study was completed last autumn. The White House group — on which Hyde and other FCC staff members will serve — is being set up by Clay T. Whitehead, a presidential adviser on communications. Whitehead, who holds a PhD degree in management from Massachusetts Institute of Technology, worked for the Rand Corp. in California before joining the White House staff.

Whitehead, in an exchange of correspondence with Hyde last week, asked the commission to join his working group in studying the problem. He indicated that the group would have comments within a 60-day period.

Hyde declined to say what effect any White House recommendations would have on the commission's decision. "I would expect this agency to act promptly once we know what position the executive department will want to take. They might turn up something we would want to consider further," he said.



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May 14, 1969 - G

COMSAT OKAYED TO BUILD ALASKA SATELLITE EARTH STATION; WOULD LINK ALASKA, CONTINENTAL U. S., HAWAII, JAPAN, PACIFIC AREA

The Communications Satellite Corporation has been authorized by the Commission to build a communication-satellite earth station near Talkeetna, Alaska, about 90 miles north of Anchorage, to provide communication services between Alaska and the rest of the United States, Japan, and other Pacific area locations (File No. 65-CSG-P-69).

Comsat proposed that at first the earth station would provide service via INTELSAT II, III, and IV series satellites. In addition to fulfilling voice circuit requirements, the Commission said it appeared that the establishment of satellite communications, initially through the Pacific Segment of the Global System, would make possible transmission of live television programs between the contiguous states and Central Alaska, and would provide Alaska, for the first time, direct high quality telecommunications links with Hawaii, Japan, and other points in the Pacific area.

Types of service to be rendered would include multi-channel telephony, telegraph, facsimile, high-speed data, and both color and monochrome television.

The Commission authorized construction of the earth station at a capital cost not to exceed \$4.5 million, as proposed in the application. The Commission ordered that construction begin within 30 days from the date of this authorization, and that it be completed by September 30, 1970.

The Commission made its grant subject to these conditions: the authorization may be modified to provide for joint licensing and joint ownership interests in the station if the Commission finds it in the public interest; the authorization does not give Comsat any right to operate the station nor any right in the use of the frequencies designated in the permit except "as hereafter may be authorized;" Comsat may not assign or transfer the permit or right granted without Commission approval; and authorization is subject to the right of use or control by the United States Government conferred by Section 606 of the Communications Act.

Action by the Commission May 14, 1969, by Memorandum Opinion, Order and Authorization. Commissioners Hyde (Chairman), Bartley, Robert E. Lee, Cox, Wadsworth, and H. Rex Lee, with Commissioner Johnson dissenting and issuing a statement.

Calls for action on domestic satellites

NASA-broadcasters will talk in June, CBS group has its plan, Marks issues call for action now

Proposals for a domestic-satellite communications system for the U. S. that have lain fallow before the FCC for two years may be energized soon.

On the one hand, the National Aeronautics and Space Administration has invited a select group, including broadcasters, to meet in Washington on June 13 to discuss possible uses of that agency's Applied Technology Satellites to test various elements of a domestic system.

On the other, a call for action "now" was sounded last week by Leonard H. Marks, former chairman of the international conference on the future of the International Telecommunications Satellite Consortium and chairman of the U. S. delegation.

NASA sent invitations last week to the three TV networks, the Ford Foundation, the Corp. for Public Broadcasting, the Communications Satellite Corp., the Canadian Broadcasting Corp. and the international common carriers.

All, in one way or another, have suggested plans for a domestic-satellite system (see page 76C). Comsat's proposal for a full-communication, pilot system is formally before the FCC. Others have filed comments on the plan. The Canadian government has announced that it plans to install a satellite system particularly to bring TV and telephone service to its more northern areas.

At the heart of the NASA consideration is the fact that once the scientific missions of its ATS flights are completed, the spacecraft with their complex electronic circuits are still useful for additional experimentation. One consideration, however, is paramount results obtained from tests must be shared. No patents or proprietary secrets can be withheld by any of the participants.

The concept of using ATS spacecraft

for additional experiments was developed by Edward Roth, a special consultant to NASA who is a former broadcast management official. Mr. Roth's consultancy terminates next month.

The actual administration of the program, should it eventuate, will be under the supervision of Jacob B. Smart, a retired Air Force general who is assistant administrator for Department of Defense and Interagency Affairs.

The vital interest of broadcasters in a domestic-satellite communications system (which could result in significant savings for lines to affiliates) is evident by the activity in FCC proceedings and elsewhere of the three television networks. Not so well known, however, is the fact that many individual stations are also interested—for example the CBS atfiliates.

Two years ago, the CBS Affiliates Board established a satellite committee to keep an eye on satellite communications, particularly the "threat" of directto-home broadcasting. A. James Ebel of KOLN-TV Lincoln, Neb., is chairman. Other members are Bill Grove, Frontier Broadcasting; August M. Meyers, Midwest Television, and Louis A. Simon, KPIX(TV) San Francisco.

The committee has represented the affiliates in filing documents in FCC proceedings and has actively kept abreast of domestic-satellite proposals reported or filed with the FCC. It hopes to persuade the FCC, should that agency approve the Comsat pilot project, to permit a group of stations in the Rocky Mountain area to cooperate financially and operationally in the establishment of an earth station in that area, possibly Montana, as a test station to determine whether individual or a groups of broadcasters can operate and finance an earth station, according to Mr. Ebel who will submit a status report

to the CBS affiliates meeting in New York next week (May 20-21). The committee also published 18 months ago a "white paper" on direct-to-home broadcasting and its threat to local broadcasting. This has been distributed to all CBS affiliates, the National Association of Broadcasters, the Association of Maximum Service Telecasters and others.

Mr. Ebel stressed that CBS has been extraordinarily cooperative in helping the committee. Mr. Ebel also noted that his committee has kept the chairmen of the affiliate boards of other networks fully informed.

Mr. Marks, speaking to a Los Angeles meeting of the satellite telecommunications subdivision of the Electronic Industry Association's Industrial Electronics Division, declared "... the time has come for the United States to arrive at a determination on how we shall use satellites for our domestic communications links....

"In my judgment we do not need further experimentation. The technology is clear, the need is substantial and the time has come for action."

Among the advantages Mr. Marks sees for a domestic-satellite system is the possible ability to "develop national daily newspapers with editions being printed in principal cities simultaneously."

He also sees educational television possibly benefiting from "drastically reduced" rates from those presently charged for coaxial and microwave connections.

"The time," Mr. Marks said, "is overdue for a decision [on a domesticsatellite policy]" and I hope that this plea will be heard by the FCC, Congress and other government agencies involved."