

2-4362-01

~~ROM~~

ED

HUGHES AIRCRAFT COMPANY

SPACE AND COMMUNICATIONS GROUP

TECHNOLOGY DIVISION

EL SEGUNDO, CALIFORNIA

26 April 1972

PLEASE ADDRESS REPLY TO:
P.O. BOX 92819, AIRPORT STA.
LOS ANGELES, CALIF. 90009

In Reply Refer To:
72(41)-08962/C6026

SUBJECT: Additional BMS Solar Array
Technical and ROM Cost Data

TO: TRW Systems Group
TRW, Inc.
One Space Park
Redondo Beach, California 90278

ATTENTION: Mr. R. F. Moe
Bldg. S, Room 1260

REFERENCES: a) BMS Proposal 72(41)-03240/C6026-002,
dated 21 February 1972

b) TWX MSG 07123 dated 24 April 1972,
R. F. Moe to J. L. Samuel

Gentlemen:

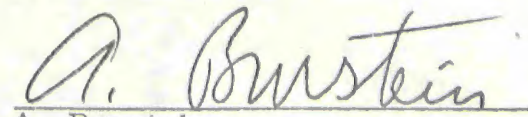
Hughes Aircraft Company is pleased to submit this additional technical and rough order of magnitude cost data covering a solar array subsystem for the Background Measurement Satellite. It is responsive to the ground rules expressed in the Reference (b) TWX with the exception that we contemplate implementing the C/SCSC system by the utilization of commitment or expenditure accounting. This variation is considered to be in the best interests of the BMS program based on the critical emphasis upon cost associated with this program.

The attached rough order of magnitude cost data reflects a substantial reduction in the price of the BMS basic program even though three major new tasks have been added -- the provision of four solar array assemblies for Category I testing, the qualification of AGE hardware, and the implementation of the AFSC C/SCSC system. TRW did not request these items be considered but they have been included based on our understanding of the Government's latest requirements. The reduction has been possible not only from the natural decrease in profit/fee rates associated with a CPIF rather than an FFP procurement but also and primarily from a complete review of the scope of the program in the interest of achieving TRW's expressed interest in cost reduction.

We look forward to continuing our discussions with TRW on the BMS program and will promptly provide any additional information required in connection with the amended quotation. Please direct any technical questions to Mr. E. O. Felkel and those of a cost or contractual nature to Mr. J. L. Samuel. They can be reached at (213) 648-4501 or 648-3436, respectively.

Very truly yours,

HUGHES AIRCRAFT COMPANY

A handwritten signature in dark ink, appearing to read "A. Burstein". The signature is written in a cursive, flowing style with a horizontal line underneath.

A. Burstein
Associate Manager
Technology Division

Attach/3

CONTEMPLATED SCOPE REDUCTIONS

The following summarizes the program changes anticipated by Hughes as means of reducing program costs by the maximum possible amount.

1. Data and Configuration Management Costs

The data submittal requirements expressed in Sections 7 and 8, Volume II of the Reference (a) proposal, will be satisfied wherever feasible by inclusions or comments in the monthly progress reports rather than by discrete formal reports.

2. Product Effectiveness

The product effectiveness costs included in the Reference (a) proposal were based on a conservative interpretation of the cost of implementing reliability, maintainability, quality assurance and quality control systems in literal compliance with MIL-Q-9858A. Since several fact-finding sessions have established that a lower level of quality assurance support might be developed which would still produce flight quality hardware, the costing approach to this task has been extensively reviewed. Of particular import in reducing the cost of this task is the level of on-premise customer participation. The approach used in reducing the cost for this task is the assumption that TRW and/or USAF participation in quality actions at Hughes will be limited to end-item acceptance testing and buy-off. Quality Control History Records, however, will be made available for review of prior quality actions and Hughes Quality and Engineering support will be available in the event of questions or clarifications relative to the QCHR's.

3. Solar Cell Ultra-Violet Filters

Since the use and value of the U-V filters in terms of improving cell output is questionable or at best unprovable, these filters have been deleted from the proposal.

4. Qualification and Development Testing of the ADA and RDA Mechanisms

The qualification test of the ADA and RDA mechanism was, in review, considered to be of marginal value and has been deleted in view of the current emphasis on program cost. The closed loop testing of this assembly with the associated electronics are assumed to be included in the TRW Category I tests. The electronics units will be qualified at the unit level and will be subjected to appropriate environmental and interface checks prior to delivery to TRW.

5. Spacecraft/Solar Array Coupled Stability Analyses and Simulations

The Hughes analyses will be limited to those necessary for providing characterizing parameters and data to TRW's stability analysis programs and simulations. Of particular importance will be control loop performance data (gains, transfer functions, etc.) and array structural dynamic characteristics. Array loading or other key solar array subsystem design data normally generated from such analyses/simulations are assumed to be available in a timely manner from TRW.

6. Solar Array Actuator Motors

The AC motors used in the FRUSA design were replaced by DC motors in the Hughes BMS proposal to minimize potential EMI problems. Since such problems did not materialize during the FRUSA/STP 71-2

6. Solar Array Actuator Motors (continued)

flight and since modifying the design for DC motors was significantly more costly, the design has been converted back to AC. 400 cycle, 115 volt AC will be required from the spacecraft for driving these motors.

7. Spares Provisioning

Spares have been reduced to the production attrition level on the basis that the schedule impact of a failure of a major long lead item can now be resolved by repair or, pending reorder, by a transient cannibalization of the Category I model (which was not available in the baseline proposal). The production attrition levels have also been reviewed and using the same logic been reduced in magnitude (and cost).

8. Solar Array Mass Models

The need for these models has been eliminated by the availability of the Category I array assemblies. All testing formerly planned using these models will be rescheduled so that the qualification model solar arrays may be used.

CONTEMPLATED SCOPE ADDITIONS

This section discusses our implementation of new tasks associated with a CPIF type subcontract and the changes in program definition we understand are now desired by the Government.

1. Cost/Schedule Control System Criteria Program

In accordance with the TRW request, a cost and schedule control system will be established which will satisfy the objective of the Cost/Schedule Control Systems Criteria set forth in Paragraph 2-2 of the Air Force Systems Command Pamphlet 173-3, dated 26 August 1970.

It will provide a framework for defining and assigning contract tasks and will summarize both planned and accomplished cost, performance, and schedule data at management levels which are appropriate to both Hughes and customer visibility and control.

The only significant variation from the AFSC C/SCSC objectives is that the planned system will account for material used on a commitment and expenditure rather than on an accrual basis.

The principal elements or features of the anticipated system are as follows:

- a. Definition and assignment of budgets for increments of work scheduled within responsibility assignments small enough in size and short enough in duration for effective control.
- b. An accurate accumulation of the applied costs related to progress of the work.

- c. A comparison of the earned value of actual resources applied with the estimated resources planned for the specific work assignments.
- d. Estimate of costs to complete the remaining work.
- e. Provision of the above data in an effective manner so that timely Hughes and customer management reviews and decisions can be made.
- f. Cost accounts will be assigned to each task at the fourth level of the work breakdown structure with customer reporting at the second level of the WBS on a monthly basis and at the third level on a quarterly basis (see Vol. II, Reference a) for task definition at each level.

2. Solar Array Qualification Model

Qualification models of the four solar array assemblies will be furnished to TRW for Category I testing. Qualification tests of these arrays are not planned at Hughes since the arrays, like the ADA and RDA mechanism, are considered so similar to the highly successful FRUSA array that further qualification testing is unwarranted.

These arrays will be configured such that one array will contain 90 percent dummy or mass-simulated solar cells and 10 percent active cells arrayed at vibration critical zones of the panels. The other three arrays will have dummy weights attached directly to the storage drum. By this test configuration active cell costs can be minimized without distorting the quality of dynamic simulation

2. Solar Array Qualification Model (continued)

for either spacecraft or array-oriented interests. As in the case of item A. 5 above, it has been assumed that pertinent dynamic response data will be available to Hughes on a timely basis.

3. AGE Qualification

The specific AGE specification cited could not be obtained. Costs are, therefore, based on the assumption of standard criteria for sophisticated aerospace AGE such as laboratory ambient, air freight, and handling environments. Requirements typical of general purpose AGE, such as extended salt spray, are assumed to be satisfied by TRW by using protective consoles or shipping containers, if required by the Air Force.

ROUGH ORDER OF MAGNITUDE (ROM) COST DATA

Based on the contemplated scope deletions and additions discussed in the preceding Attachments I and II, the following ROM costs are submitted. Such costs do not represent a firm commitment by the Hughes Aircraft Company and are provided to assist TRW in its planning of the BMS program. They have been prepared on the basis of a CPIF sub-contract, with a target fee of 8 percent and an 85/15 cost share.

A. Basic Program

<u>Item</u>	<u>Attach. I</u>	<u>Attach. II</u>	<u>C/SCSC*</u>
Mfg. Cost	\$ 4237K	\$ 4941K	\$ 123K
G&A	448K	521K	13K
Fee	<u>375K</u>	<u>437K</u>	<u>11K</u>
Price	\$ 5060K	\$ 5899K	147K

B. Option I

Mfg. Cost	\$ 2250K	\$ 1823K	\$ 46K
G&A	256K	192K	5K
Fee	<u>200K</u>	<u>161K</u>	<u>4K</u>
Price	\$ 2706K	\$ 2176K	\$ 55K

C. Option II

Mfg. Cost	\$ 2434K	\$ 1988K	\$ 48K
G&A	281K	210K	5K
Fee	<u>218K</u>	<u>176K</u>	<u>4K</u>
Total	\$ 2933K	\$ 2374K	\$ 57K

*Costs included in those shown for Attach. II.

OFFICE OF TELECOMMUNICATIONS POLICY

INFORMATION MEMORANDUM

December 12, 1972

SUBJECT: Broadband Demonstration Program

TO: The Director

FROM: Tom Mustin

BRIEF SUMMARY:

OMB budget examiners have been briefed on Broadband Demonstration Program; conflicts with HUD still require resolution

WHY IT IS WORTHWHILE TO READ:

Summarizes status of Broadband Demonstration Program planning

*Bruce/Hank
For cable report
dinitiated.*

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

December 12, 1972

To: The Director
From: Tom Mustin *Tom Mustin*
Subject: Broadband Demonstration Program

Bryan Eagle, Snowden Williams, and I met on December 7 with Buck Bassett and the budget examiners for HUD (R&T) and HEW (OTP) to apprise them of the status of demonstration program planning. We presented some background on the cable industry and the Cabinet committee, explained why a demonstration is necessary, and what its objectives would be, and finally stressed what we feel are the two principal issues at present, namely that:

(a) it is critically important that the demonstration be undertaken without delay if it is to provide worthwhile information before the industry has expanded too far to make use of it; and

(b) it is essential that the demonstration should integrate the planned projects of HEW and HUD into a single comprehensive program if it is to meet its objectives.

We made no effort to show overall program costs, but rather presented the cost planning figures for the two major programs which would comprise the bulk of the demonstration -- HUD's Community Information Centers and HEW's educational telecommunications project (the two total roughly \$150 million).

As the OMB examiners noted, putting the demonstration together will require re-direction of approved and planned funds from a number of independent programs, not only those of HUD/R&T and HEW/OTP, but also others such as NIH, USAC, HSMHA, etc., and should also call for cancellation or cutbacks in some on-going projects which would be rendered redundant, e.g., Jonathan and USAC. It is their feeling, and mine, that this can likely only be

done if the program is announced as a Presidential initiative, and if a single overall coordinator is assigned the responsibility and authority to pull it together. In the absence of a single program manager with appropriate authority, neither agency sees any incentive to modify its own plans even slightly to adapt to an integrated program, and both appear to be proceeding on the assumption that they will ultimately be running their own independent projects. The commitment of the Cabinet committee principals to a comprehensive demonstration has not made itself felt at the working level.

Our fundamental disagreement at this point is still with HUD, which wants to begin with an 18-month project definition study in late FY73. I doubt that such a timetable could lead to a useful demonstration (it would simply be too late), and do not believe that more than 6 months is required for project definition. They are adamant enough, however, that I do not expect them to cooperate unless they are directed to.

I recommend that we proceed as necessary to elicit a Presidential initiative announcing this program and naming the Director, OTP, as its coordinator, and that we go from that point according to our own timetable and our own strategy.

January 26, 1973

MEMORANDUM FOR

Honorable Ken Cole
The White House

I have sent Ken Dam a copy of my December 6, 1972, memorandum for John Ehrlichman, since I thought with the realignment of responsibilities George Shultz would have an interest.

I am concerned that we get approval for some of these matters promptly since it is getting very difficult to carry on without some agreement as to where we are going. Please let me know how we can best proceed.

Clay T. Whitehead

cc: DO Records
DO Chron
Mr. Whitehead
Eva

CT Whitehead jm

Judy:

Tom said to send a copy of the Ehrlichman memo to Jon Rose
but without the decision blocks --

note

to Jon

A more detailed memorandum on the international communications
issues will be coming over to Mr. Flanigan later this ~~week~~
week.

OTP RESPONSIBILITIES

- legislation or regulatory practices affecting communications generally
- broadcast regulatory policy
- radio frequency spectrum allocation
- cable television development
- the television program production industry
- regulation of the domestic common carrier industry
- growth of competitive communications services
- domestic communication satellite systems

- international communications industry structure
- INTELSAT and other international communications issues
- foreign relations aspects of such matters as the sale of communications equipment to China and Iron Curtain countries
- international negotiations on communications policy and facilities

- public broadcasting
- political aspects

- government communications systems
- emergency communications

OFFICE OF TELECOMMUNICATIONS POLICY

EXECUTIVE OFFICE OF THE PRESIDENT

WASHINGTON, D.C. 20504

December 6, 1972

DIRECTOR

MEMORANDUM FOR

Honorable John Ehrlichman
The White House

Since its inception two years ago, OTP has enabled the Administration to play a larger role in communications policy. Many of our accomplishments have resulted from quick reaction to immediate problems, such as the President's concern with television reruns and the FCC's inability to deal with the domestic satellite issues. Now OTP is prepared to advance a series of affirmative initiatives that can be tied to the President's program for next year.

I believe this package is consistent with the President's programs, restructuring government to let the private sector play its role, and enhance rather than erode our most important traditions regarding government and the communications media. Almost no Federal expenditures are involved, and some budget savings could be realized. A brief summary of the most significant of these initiatives is attached at Tab A. The first two (broadcasting and cable) have by far the largest political implications.

During the past twenty years, the communications industry has grown rapidly and undergone great technical change. It has contributed greatly to GNP and had great impact on our national life. The pace of both the economic and technical advance is clearly going to continue to increase at even faster rates over the next few years. Everyone -- particularly minority and special interest groups -- wants some type of political or ownership control over the media; and many business interests want a share of the new communications markets. The FCC's procedures (like those of most Federal regulatory agencies) are ill-suited to deal effectively with the rapid technical change and the politically charged issues of communications.

There will, therefore, be both the opportunity and the need for firm Administration leadership in establishing some basic policy directions. Decisions made during the second Nixon term

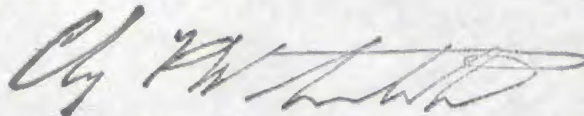
will largely determine the extent to which the benefits of the communications revolution are realized by the public and by industry -- and whether communications regulation by the Federal Government will be locked into the same kind of morass as transportation and power or whether a more competitive, free-enterprise framework is created.

The OTP initiatives are intended to restructure government regulation in an evolutionary way to guide the growth of communications technology and services in keeping with two main principles: (1) there should be more reliance on free enterprise and competition in communications rather than monopoly and government regulation, and (2) bureaucratic controls over the content of the media should be minimized. If the OTP program can be implemented in keeping with these principles, we can encourage the growth of at least three new multi-billion dollar industries: the broadband cable television industry, the computer information services industry, and the mobile communications industry. Such growth would contribute substantially to our economy and could help relieve unemployment in such critical sectors as the aerospace, electronics, and the film and television production industries.

As a result of the public broadcasting issue and our key role in the cable TV compromise, OTP is visible politically on the Hill and therefore vulnerable if we do not advance a substantive program of accomplishment. Similarly, the Administration's image on communications matters has been colored by the network news battle, and we need a more statesman like record of policy development and advocacy to stand on.

I am sending this same package to Pete Flanigan, emphasizing the international area, and have discussed the broadcasting section with Chuck Colson. I believe the President should be appraised of the overall effort, with special emphasis on broadcasting and cable TV. If time permits, it would be highly useful for me to discuss the most important aspects with you and him. However, the most important thing is to get approval to proceed so we can be ready to go early next year.

I would be happy to discuss this with you or to supply any further information you need.

A handwritten signature in dark ink, appearing to read "Clay T. Whitehead", with a stylized, flowing script.

Clay T. Whitehead

Attachment

I. BROADCASTING

Goal

Bring broadcast regulation more in line with our private enterprise media philosophy, stem the tide of demands by activist groups for free broadcast time, and correct the anticompetitive power of the TV networks.

Initiatives

A. Support statutory extension of broadcast license terms to five years; place burden of proof on renewal challengers; prohibit FCC establishment of program standards.

B. Support eventual elimination of detailed case-by-case enforcement of the Fairness Doctrine, but only when public confidence in broadcasting warrants and Congressional passage is feasible (not 1973).

C. Attempt to reduce obstacles blocking establishment of new commercial TV networks by changes in AT&T tariffs, FCC networking rules, and possible antitrust actions.

Impact

Initiatives A and B will be supported by most broadcasters, although they would prefer a simple extension of the license term. Minority and activist opposition would be mixed. There is likely to be little general public interest. Would require some effort to get key Congressional support.

Initiative C would be opposed by all broadcasters but should find some public and Congressional support if handled in the positive tone of more programming diversity and competition. Initiative A (and to a lesser extent B) is a prerequisite to the success of C as well as to establish our credibility on First Amendment issues.

II. CABLE TELEVISION

Goal

Create a new legislative framework for development of broadband cable television and the many entertainment, informational, and educational services a new cable television industry could provide (following Cabinet committee report).

Initiatives

Introduce legislation following recommendations of the Cabinet committee to create a statutory policy framework (now lacking) for the development and regulation of the cable television industry. This would resolve such issues as programs and channels for pay, networking competition with broadcasting, cross-media ownership of cable systems, and division of jurisdiction between the Federal Government and the States.

The committee recommends a pilot program to evaluate the use of cable to deliver government services more efficiently and to shorten the lag in bringing the technology to the marketplace. The program will cost \$25 million in FY74.

Impact

Assuming a moderate level of Presidential impetus, there is a good chance that some influential Congressmen and Senators, cable operators, broadcasters, and other media people would support such legislation. Others in the cable and broadcast industries will oppose it; but in the public's eye, they could be depicted as protecting their narrow economic interests by keeping more program choice from the audience. The biggest political issue would be "pay TV." The ability of customers to buy programming directly by the program or by the channel over cable is too important to allow it to be prohibited, but it is unlikely that the Congress would pass cable legislation that did not, in some way, retain certain program types (like professional sports) on "free" TV. Privacy safeguards would be built into the legislation to counteract "Big Brother" fears. Cable is here (10% of homes) and growing rapidly (up to 50% of homes by 1980). Hard-line broadcasters and theater owners are the only opponents. This is a positive initiative--costing no tax dollars--one the President can get behind and make the growth of cable service a Nixon accomplishment. The pilot program will help make this a more exciting initiative, convey movement in bringing technology to bear on government programs, and accelerate the marketability of the new technologies.

III. DOMESTIC COMMON CARRIER INDUSTRY

Goal

Promote more efficiency and competition in the domestic common carrier industry as new communications services arise.

Initiatives

A. Legislation to promote competition:

1. To authorize bulk leasing, brokerage, and resale of common carrier services;
2. To require identification of the extent of cross-subsidization among various common carrier services and enterprises;
3. To include economic efficiency, as well as equity, as a criterion for FCC approval of facilities and rate structures;
4. To limit the scope of FCC jurisdiction over non-monopoly services;
5. To extend domestic rates for telephone calls to Hawaii and Alaska.

B. Create an interagency study group to analyze and determine policy regarding the future role of the Bell Telephone System in providing common carrier services in competition with specialized competitive communications services.

Impact

The major impact would be to increase competition to AT&T, a move that would be vigorously opposed by that company and many of its stockholders, but supported by major elements of the electronics and communications industries. The public has little love for the phone company, and the Congress would feel little grassroots pressure to leap into the fray to protect AT&T's monopoly services.

IV. INTERNATIONAL COMMON CARRIER INDUSTRY

Goal

Restructure regulation of the U.S. international common carrier communications industry to eliminate artificial distinctions between voice and record (data) message carriers, to enhance the private enterprise character of Comsat, and to introduce more competition into satellite and undersea cable construction.

Legislation Initiative to Correct Deficiencies in the International Common Carrier Industry

A. Require the FCC to coordinate with the executive branch so that effective government-industry agreements with foreign governments regarding international communications facilities can be negotiated.

B. Terminate privileged common carrier ownership and participation in Comsat and eliminate Presidentially appointed directors from the Board.

C. Clarify statutory guidance to the FCC for regulating U.S. international carriers to allow more competition, redefine the classes of such carriers to reduce the obsolete distinction between voice and data communications, and to put satellites and undersea cables on a comparable basis under law.

Impact

The Byzantine structure of the U.S. international communications industry, as shaped by the FCC, is inefficient and not competitive. There is almost no public perception of the issue, and since there are only a few companies in the international market (AT&T, RCA, ITT, Comsat, and Western Union International), the general press is likely to interpret this mainly as an economic decision without political overtones. Industry opposition would probably not be uniform, and some companies would support those parts of the initiative that benefited them. Provision A may be opposed by FCC which would view it as a transfer of some FCC power to the executive branch. We have been under pressure from the Congress to submit our policy since last year and have delayed as long as possible. We will really take heat if we do not now proceed.

V. GOVERNMENT COMMUNICATIONS

Goal

Improve the Federal Government's own use of communications resources to achieve national security objectives. Minimize overlapping responsibilities, improve performance of public safety agencies, and realize government savings in the procurement of communications facilities and services.

Initiatives

A. Reorganize and streamline government communications and computer systems management to achieve more effective mechanisms for Presidential guidance, and to cut present budget and staff levels.

1. Short-term communications management improvements:
 - a. replace National Communications System staff and responsibilities with formal coordination by the Council for Government Communications Policy and Planning.
 - b. streamline responsibilities and functions of Defense Communications Agency.
 - c. eliminate non-essential Department of Commerce communications functions and shift OTP support functions to National Bureau of Standards or GSA.
2. Combining communications/computer systems management.
 - a. assign OTP lead responsibility for computer/communications area; to be coordinated with OMB computer responsibilities.
 - b. establish arrangements for coordination of Executive Office computer/communications systems.
 - c. Direct agencies to combine management of computers and communications.

B. Establish executive branch policy for purchasing of telecommunications services and equipment, including coordination of procedures for budgeting and frequency assignments.

C. Coordination and consolidation of government radio navigation systems and satellite communications systems.

D. Policy statement and experiment on the inclusion of economic value in assignment of radio frequency to government agencies.

E. Program to determine the environmental aspects of electromagnetic radiation.

F. Review Federal department and agency funding of programming (including public service announcements) intended for broadcast to the general public or for schoolroom instructional purposes.

Impact

With the exceptions of initiatives F and G, this package is entirely an executive branch "housekeeping" matter, and, as much, will have little or no outside impact. The environmental study initiatives (F) are noncontroversial and "pro-consumer." Initiative G could generate public controversy, since it will be seen in part as an attempt to cut back on the HEW efforts to mold "child development" through TV programs. In view of a general public and congressional tolerance of HEW "social engineering," the Administration could be painted as regressive on this issue. However, the "Big Brother" fear works for us here.

I. BROADCASTING

Action

Approve _____

Disapprove _____

Comment _____

II. CABLE TELEVISION

Action

Assuming the Cabinet committee report comes out with a responsible policy, which can be reflected in legislation, the initiative should be followed as discussed above.

Approve _____

Disapprove _____

Comment _____

III. DOMESTIC COMMON CARRIER

Action

The goal and the initiatives set out above should be approved as a general approach, with OTP to prepare the legislation outlined above and process it through the OMB clearance process for final Administration approval.

Approve _____

Disapprove _____

Comment _____

IV. INTERNATIONAL COMMON CARRIER INDUSTRY

Action

The goal and the initiatives set out above should be approved as a general approach, with OTP to prepare the legislation outlined above and process it through the OMB clearance process for final Administration approval.

Approve _____

Disapprove _____

Comment _____

V. GOVERNMENT COMMUNICATIONS

Action

Instruct OMB and OTP to develop a plan for reorganizing government communications and computer systems management, as outlined in Initiative A, for review and decision by President.

Approve _____

Disapprove _____

Comment _____

Authorize OTP approach on Initiatives B through E, in coordination with OMB, as appropriate.

Approve _____

Disapprove _____

Comment _____

Direct OTP to study nature and extent of government funding of programs for broadcast to general public and for schoolroom instruction, and report back on results and recommended action.

Approve _____

Disapprove _____

Comment _____