

The COOK Report on Internet →

NREN

What Is ANS, and ANS CO+RE?

Incomplete Delaware Corporate Filings Reveal Ambiguities

May 26, 1992 -- More than 20 months after the September 13th 1990 incorporation of Advanced Network and Services, Inc. the nature of the corporation and its relationship to its corporate sponsors and federal contractors remain obscure.

I have obtained ANS, Inc and ANS CO+RE's certificates of incorporation and a single annual report from the Division of Corporations of the Secretary of State of Delaware. My visit to Dover Delaware on May 22, 1992 revealed that the role to be taken by the for-profit subsidiary in doing such things as reinvesting its profits in building national network infrastructure is not defined in the Certificate of Incorporation..

Examination of publicly available documents also revealed that ANS CO+RE has failed to file a required Annual Report due March 1, 1992. This means that the officers of ANS CO+RE are unknown, that the total gross assets are unknown, and any franchise tax liability is also unknown. While the parent ANS Inc. filed a 1990 Annual Franchise Tax Report on January 22, 1991, as of May 22, 1992, the state of Delaware had not received a 1991 Annual Franchise Tax Report for either ANS or ANS CO+RE.

I showed the papers that were on file to Bob Faynik, Manager of Franchise Taxes, Delaware Department of State. Mr. Faynik said that ANS would not be considered in good standing with the State of Delaware and could not get a certificate of good standing until it filed the missing Annual Reports and paid a \$50 fine plus 1.5% interest on the fine and any tax owed per

month for CO+RE's failure to file.

Feynik also said that a non profit company is under no obligation within Delaware to file any extra paperwork. This is quite different from Federal law where, when a corporation that asks for and obtains 501 (c)(3) status, it must file Form 990s that reveal significant details of its finances.

Those who have followed this debate closely will recall that on October 2, 1990 Bill Schrader, President of PSI, a major ANS competitor, posted a message to the com-priv internet mailing list. It was a skeptical challenge to the announced purpose of ANS and the role of IBM, MCI, MERIT and the NSF. In his posting Schrader predicted the launch of ANS's for profit spin off ANS CO+RE and indicated that he believed that ANS was not really serious about its 501 (c)(3) status. Schrader said:

"1) Lets take IBM/MCI first. They appear to be temporarily acting under the ANS tax exempt shield, if and when such tax exemption is approved by the IRS. How many of you actually think it will be approved? Even if they have applied for it, the automatic provisional 501 (c) (3) status will last for one year and by that time a second stage (?) of their business plan might come into play. At that time, tax exemption will no longer matter, having served its purpose in obtaining acquiescence from the FARNET membership networks as well as taking most of their customers. The next action 'might be a commercial spin off, 'removing any need for ANS at all. This ANS II, of

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Vol. I, Number 3, June 1992

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Is COREN a Plan to Interconnect Network Access Points?

The network access point concept described in the IINREN implementation plan issued on May 15, 1992 seems at first glance to this observer to go in a positive direction.

However, once again we have an example of how being a part of the 1987 cooperative agreement would appear to have allowed one of the players (this time MCI) to get a jump on its competition.

Consider the following quoted from the plan:

"As private vendors assume an increasing portion of the now federally-subsidized market for wide area inter-networking services and infrastructure, backbone clients will eventually contract with commercial transit networks for inter-regional connectivity.

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course, 'might' be backed entirely by IBM and MCI, while still holding on to whatever is left of the original start up funds, 'under contract to MERIT.'"

One would think that ANS would have acted promptly to file its 501 (c)(3) declaration with the IRS in order to prove Schrader's assertions as baseless. An accountant who specializes in 501 (c)(3) filings has told me that a company, barring extraordinary circumstances, has 15 months from the date of incorporation to file. That would have meant a deadline of December 13th 1991. On May 17th I asked Susan Eldred, ANS Public Relations Director via electronic mail to tell me when ANS filed. She did not respond. On May 26, 1992 I reached her by telephone. She said that ANS filed its Form 1023 with the IRS on October 27, 1991 and that in December the IRS had confirmed that the review process would be lengthy because of a considerable backlog of applications.

I am told that delay in filing for recognition of 501 (c)(3) status buys a company time. For example if ANS's fiscal year is a calendar year (from its papers on file in Delaware it is unclear what it is), it would have until the end of the year following its application to file a Form 990. In other words the first release of fiscal information about ANS would not cover the year 1991. It would cover 1992 and not have to be released until January 1 1993. One of the trade-offs for tax exemption for a non profit is a greater degree of public scrutiny over the way the 501 (c) (3) handles its affairs. By delaying its filing it appears that ANS can buy more than 27 months of freedom from Form 990 scrutiny. Of course to suggest that ANS may have wanted to buy 27 months of freedom is just speculation. Nevertheless the *context* in which these actions were taken raise questions that will be dealt with in the conclusion to this article.

Delaware Records on the Parent Company - ANS, Inc.

ANS, Inc. is incorporated "under the General Corporation Law of the State of Delaware," which means that it is a domestic corporation with the obligation of filing annual reports by March 1 of every year. The registered office is "1209 Orange Street, City of Wilmington. The name of its registered agent at such address is The Corporation Trust Company." (This is the principal content of Articles One and Two.)

Mr. Faynik said that ANS would not be considered in good standing with the State of Delaware and could not get a certificate of good standing until it filed the missing Annual Reports and paid a \$50 fine plus 1.5% interest per month for CO+RE's failure to file.

The Third Article of the Certificate of Incorporation states:

"The Corporation is a non-profit organization dedicated to the advancement of education and research in the interest of improving the ability of the United States to compete in the global economic environment. The Corporation will concentrate on computer networking and related services, an area clearly recognized as a vital component of United States competitiveness. The Corporation shall help establish a high-speed computer network which will be maintained at the leading edge of technology, and which will eventually feature multi-gigabit per second data transfer rates. The Corporation will also help to expand the access to and interchange of information technology resources among academic, government and industry users. In addition, the Corporation will engage in research and development work which will support the academic and research communities and contribute to United States preeminence in high speed network technology and related services."

The operative sentence here is clearly:

"The Corporation shall help establish a high-speed computer network which will be maintained at the leading edge of technology, and which will eventually feature multi-gigabit per second data transfer rates." In other words ANS is created as a non profit to help build the NREN.

Its creators are the three entities that hold the NSF cooperative agreement to run the network backbone that will become the NREN backbone.

On December 31, 1990 Hans Werner Braun, Principal Investigator for the Merit NSF T-1 Backbone cooperative agreement gave the following description of the situation: "Regarding the Merit-ANS relations. Merit holds the cooperative agreement with the National Science Foundation. Merit initially then had joint study agreements with IBM and MCI to implement the

NSFNET backbone, while also receiving additional funding from the State of Michigan. ANS is a joint creation of Merit, IBM and MCI to undertake next steps towards a national infrastructure. Merit contracts with ANS to provide the relevant services. ANS in turn contracts with Merit for doing a good part of the work (like engineering, planning, operations, information related stuff). ANS themselves has created an organizational structure that in reality works jointly with Merit and the other project partners to make things work. While there are some formal relations, in reality it is a collaborative and cooperative effort of the project partners."

"ANS is a joint creation of Merit, IBM and MCI to undertake next steps towards a national infrastructure. Merit contracts with ANS to provide the relevant services. ANS in turn contracts with Merit for doing a good part of the work (like engineering, planning, operations, information related stuff). . . . While there are some formal relations, in reality it is a collaborative and cooperative effort of the project partners."

If one were uncharitable, one could offer the following interpretation: ANS was positioned as a non profit (implied charitable) organization by the beneficiaries of the 1987 backbone agreement so that it would look to policy makers that they were prepared to use large amounts of their own resources to build the NREN for the researchers and educators of the United States. In fact on January 4 1991 Joel Maloff, ANS Vice President of Client Services stated:

"Regarding ANS's contributions to the backbone, ANS and the sponsors of ANS have contributed roughly 2/3 of the funding for the NSFNET backbone with only 1/3 coming from NSF."

It appears that MERIT, IBM and MCI were trying to position ANS as the vehicle into which the Federal government would funnel funds for NREN construction. It also appears according to letters from the NSF Director Steve Wolff to MERIT in September 1990 and May of 1991 (cited by Bill Schrader on com-priv in early December of 1991) that the NSF granted ANS, in return, the rights of commer-

cial use of the backbone that were the subject of Congressional hearings on March 12, 1992. (See **NSF-ANS Agreements** on page 12.)

But let us continue to Article 4:

“No part of the earnings or assets of the corporation shall inure to the benefit of or be distributable to, its members . . . , directors officers or other private persons, except that the corporation shall be authorized and empowered to pay reasonable compensation for services rendered and to make payments and distributions in furtherance of the purposes set forth in Article Third above.”

ANS has publicly quoted the first part of this article often. To my knowledge it has never quoted the concluding clause beginning with the words “except that the corporation...”

Article 4 concludes that “no substantial part of the activities of the corporation shall be devoted to the carrying on of propaganda, or otherwise attempting to influence legislation. . .” (I am told that, depending on their size, 501 (c)(3)s can spend between 5% and 20% of revenue on lobbying.)

Article 5 states that, if the corporation should cease to operate, its assets would be distributed in a way to further its 501 (c) (3) objectives, and that “in no event shall any portion of such transfer inure to the benefit of any member of the Corporation. . .”

Article 6: “The corporation shall be a membership corporation that is not organized for profit and shall not have the authority to issue capital stock. . . . The members of the corporation shall be MERIT, Inc., International Business Machines Corporation and the MCI Communications Corporation.”

Article 7: “The business and affairs of the Corporation will be managed by or under the direction of the Board of Directors. . . .”

“The number of directors constituting the initial Board of Directors shall be eight, comprised by three Member Directors and five additional directors (the ‘Unaffiliated Directors’).”

The certificate lists the names and addresses of the three Member Directors who are to select the five “Unaffiliated Directors.” John Armstrong

from IBM, Richard Liebhaber from MCI and Douglas van Houweling are the three. Van Houweling is given his University of Michigan title as Vice Provost for Information Technology rather than his affiliation with MERIT, Inc the third of the founding Members.

Article 8: “The name and mailing address of the incorporator is as follows:

Name	Address
Mr. Allen H. Weis	52 Burying Hill Road Green- wich CT. 06831”

Article 9: “. . . a director of the Corporation shall not be liable to the Corporation or its members for a breach of fiduciary duty as a Director. No amendment to or repeal of this Article Ninth shall apply to or have any effect on the liability or alleged liability of any Director of the Corporation for or with respect to any acts or omissions of such director occurring prior to such amendment or repeal.”

Article 10: “No member of the Corporation and no Director of the Corporation shall be under any duty to disclose to the corporation, or any member of the Corporation, any information or material confidential to such member or Director, even if such disclosure would be of interest or value to the Corporation or other member. Each member of the corporation shall have full flexibility to engage independently or with others in other ventures and business of every nature and description, and neither the Corporation, nor any other member, shall have any rights or obligations in or to such independent ventures or businesses or the income or the profits derived therefrom.”

Is Article 10 saying that the corporate interests of the founding members: IBM, MCI, and MERIT come first — even if they are at the expense of ANS? Art Brodsky, the author of a major article on NREN in the June 5th, 1991 *Communications Daily* gave a very different view, writing that “Weis was firm in turning aside the suggestion that ANS was a front organization for IBM’s strategic agenda: ‘We are not a front organization for anyone.’”

Strategic agenda or not, it is worth remembering that Weis is a former IBM Vice President It is also worth

noting that a reading of the trade press for the past two years makes it very clear that IBM mainframes dependent on SNA for networking capabilities are being challenged - some would say overwhelmed - by wide area TCP/IP internetworked corporate LANs. According to recent figures from Forrester Research in 1991 7% of Fortune 1000 branch offices had replaced SNA networks with LAN Internets. By 1995 this figure is expected to grow to 30%. To bring it down to a personal level, a DuPont network systems manager said to me last week on a flight to St Louis that Dupont is replacing \$250,000 IBM mainframe front-end-controllers with \$20,000 multi-protocol routers. It would appear safe to conclude that the routers that ANS is deploying on the T-3 are very important parts of IBM’s strategic future.

Is Article 10 saying that the corporate interests of the founding members: IBM, MCI, and MERIT come first — even if they are at the expense of ANS?

Article 11: Grants the right to “amend alter or repeal any provision contained in this certificate of incorporation, by written resolution of the Board of Directors approved by a vote of three fourths of the Board of Directors acting at a meeting at which a quorum was present and voted on such matter; provided, however, any change in the requirements for fixing the number of directors on the Board of Directors shall require only the unanimous approval of the Member Directors.

IN WITNESS WHEREOF, the sole incorporator has executed this certificate of incorporation on this day of September 1990.”

Signed, Allan H. Weis

(Al apparently forgot to fill in the date. The space in front of the word “day” is blank.)

It would be interesting to know whether the Bylaws of ANS defines a quorum as 4 or 5 of the 8 directors. If the definition is 4, the Member Directors would have the three fourths vote of the quorum necessary to amend any provision in the certificate. Al Weis is a Director as long as he remains President of ANS and is not counted as a Member Director. Consequently, even if the definition of a quorum were 5, the three member directors and Al would have the three fourths vote necessary to make fundamental

changes in the purpose and operation of ANS.

The Sole Annual Report

ANS' 1990 Annual Report filed on January 22, 1991 lists "non-taxable/religious, charitable, non-profit" under the box asking Federal Employer Id. No. Under Type in the same box is the number 13-3585550. Nature of Business is "Network Services". Principal Place of Business Outside of Delaware: 100 Clearbrook Road, Elmsford, NY 10523.

The directors are listed in three columns: by name, address, and expiration of term.

Al Weis has a term that does not expire as long as he remains President of ANS. MERIT's Doug van Houweling has a term that expired on September 30, 1991. IBM's John Armstrong has a term that expired on September 30, 1991. MCI's Richard Liebhaber has a term that expired on September 30, 1991. The University of California's R. West has a term that expires on September 30, 1992. Vanderbilt's J. Wyatt's term expires March 31, 1993. The term of McGraw Hill's J Dionne expires September 30, 1993 and Merck's M. Williams on March 31, 1994.

Al Weis, R. Harris, J. Becker, J. Maloff, and J. K. Parker are listed as Officers with terms expiring on September 30, 1992.

Note that the terms of all three founding Member Directors have expired! Because ANS has failed to file its 1991 Annual Report, the identities of its three most important directors are apparently no longer a part of the legal public record.

Note that the terms of all three founding Member Directors have expired! Because ANS has failed to file its 1991 Annual Report, the identities of its three most important directors are apparently no longer a part of the legal public record.

So much then for ANS, the aspiring non profit corporation dedicated to the building of network infrastructure for American researchers and educators.

What about the profit making spin off: ANS CO+RE? Unfortunately there is even less on the public record about this very critical company.

ANS CO+RE Certificate of Incorporation

On May 30, 1991 ANS CO+RE Services, Inc was incorporated as a domestic corporation "under the General Corporation Law of the State of Delaware" with the same registered office and agent (Corporation Trust Center) as Advanced Network and Services, Inc. On June 7, 1991 to correct " a Certain Error in the Certificate of Incorporation Filed May 30, 1991" its name was changed to ANS CO+RE Systems Inc.

Unlike Article Three for ANS, Inc, Article Three for ANS CO+RE is quite succinct: "The nature of the business of the Corporation is to develop and market high speed computer network technology and related services, and to engage in any other lawful activity for which corporations may be organized under the General Corporation Law of Delaware."

In its public statements ANS has given the impression that CO+RE would be the vehicle for selling network connections to commercial companies. On June 10, 1991 it posted the preceding week's press release to the com-priv mailing list. "The new CO+RE Service will enable the private sector and research and education community to interconnect with fewer restrictions via existing computer networks," was the way it was put. The implication appears to be that the commercial use restriction that applied to use of the NSFnet backbone would not apply to ANS CO+RE customers. ANS' statements also implied that profits from ANS CO+RE would be plowed back into ANS, Inc - its non profit arm. "Revenues from the provision of CO+RE Service, after covering associated expenses will be used to enrich national networking infrastructure," according to the ANS press release.

ANS CO+RE had large ambitions. In its July 1991 issue *Telecommunications* wrote that the "for profit subsidiary — ANS CO+RE Systems Inc — . . . will develop the T-3 based Internet backbone which it manages and market it for commercial use. In doing so, ANS has clearly stated its intentions to pursue corporate customers, including those in the Fortune 1000." "Weis told

Telecommunications that the Internet backbone service can offer 'expansive coverage in the US, very high speeds but also a range of speeds, and secure gateway facilities.' Weis said that the ANS network, for example, could be used as a cost effective alternative to a nationally deployed private T-1 network." Some have remarked to me that Weis' statement sounded to them like an invitation to large corporations to outsource their T-1 nets to ANS CO+RE.

One would hope for some clarification of the relationship between ANS and its subsidiary ANS CO+RE elsewhere in the CO+RE certificate of incorporation. Unfortunately I found none. Here is what I did find.

CO+RE Not Sharply Defined

Article 4 gives CO+RE authority to issue one thousand shares of stock, "all of which shall be common stock of one class, par value of one dollar (\$1.00) per share, amounting in aggregate to the par value of one thousand dollars (\$1,000.00)."

Article 5 gives the name and mailing address of the incorporator as Louis R. Cohen, 2445 M Street, N.W., Washington, DC 20037-1420.

A source has told me that Louis R. Cohen is "one of the smartest attorneys in Washington DC" and is a partner at the law firm of Williams, Cutler and Pickering which is also IBM's principal law firm. I asked if this should be taken as a sign that IBM had a substantial interest in the success of ANS CO+RE. "Oh, for sure," was the reply. "You can consider it as one of the family of IBM companies."

I asked if this should be taken as a sign that IBM had a substantial interest in the success of ANS CO+RE. "Oh, for sure," was the reply. "You can consider it as one of the family of IBM companies."

According to **Article 6** "the business and affairs of the Corporation shall be managed by or under the direction of the Board of Directors which may exercise all the power conferred under the laws of Delaware."

“The name and mailing address of each person who is to serve as a director until the first annual meeting of the stockholders, or until a successor is elected and qualified, are as follows:

Name	Mailing Address
Allan H. Weis	100 Clearbrook Road, Elmsford NY 10523"

Two paragraphs later we read: “the Board of Directors is expressly authorized to adopt the Bylaws of the Corporation and to amend or repeal any provision thereof, except that a provision adopted by the stockholders and declared as part of such adoption, to be amendable or repealable only by the stockholders shall be amendable or repealable only by the stockholders.”

Almost two years after the formation of ANS Inc. with no ruling from the IRS on its 501 (c) (3) eligibility, we also have very little knowledge of its profit making subsidiary which has failed to file its required Annual Report for 1991. Such a report would identify the Directors of ANS CO+RE. In its absence, all that we may safely assume is that Al Weis may be its sole director and possibly the author of its Bylaws.

Article 6 also notes that with the exception of Weis, “the manner of election of the Board of Directors shall be as set forth by the bylaws.” Unfortunately we do not know:

who the directors are; what the
by laws say, or who the stock
holders are.

The Certificate of Incorporation does not mention any relationship to Advanced Network and Services, Inc as the parent company. It does not mention any requirements for profits to be fed back into the parent company. We must take on faith the announced good intentions of the parent company.

Article 7 protects the private property of the Directors and Officers of the Corporation from liability for payment of corporate debts. It also states that a “Director of the corporation shall not be liable to the or its stockholders for monetary damages for breach of fiduciary duty as a Director.” Finally the corporation shall protect each Officer, Director, and employee against any liability stemming from action believed to be in the best interests of the corporation.

Article 8 covers repeal or amendments of provisions of the Certificate of Incorporation.

Article 9 allows limitations on the transfer of shares of stock in the corporation.

Louis R. Cohen has dated (May 30, 1991) and signed the certificate.

What Is ANS?

It would seem that ANS has been allowed to operate with a great degree of trust. Even Senator Gore, the sponsor of the legislation creating the network that ANS would like to “help establish,” was quoted by ANS in its June 1991 press release noting the establishment of ANS CO+RE. However, to the best of my knowledge, other than discussions about a national network infrastructure pool that the NSF asked ANS to establish, there is no specific mechanism for identifying revenues and using them to “enrich national networking infrastructure.” In other words, little, if anything, has been done to further these lofty aims.

Of course it is speculation to wonder whether in taking a long time to file for 501(c)(3) clearance with the IRS, ANS wanted to buy 27 months of time free from the scrutiny that release of a Form 990 would entail. However, because the existence of ANS has been controversial from the very beginning, one would assume that they would be squeaky clean in all their actions. When they also fail to file required Annual Reports - especially given their resources - it does raise one's suspicions.

We apparently have a dual company in ANS. On the one hand, a would be non-profit. On the other hand, a profit-making enterprise. Yet with the delay in filing for 501 (c)(3) status the status of the “non-profit” has not been declared by the IRS. And with the failure of the profit making enterprise to file its annual report we know nothing about its directors or affairs. In fact it seems incredibly sloppy — given who these people are — that they could be, as this is written, roughly 85 days late in filing two required annual reports with the State of Delaware.

Why am I saying this? Because the future of the National Research and Education Network is at stake. The NREN will have a major impact on the flow of information in this nation and on citizen's access thereto. A lot of power is at stake. The public has a right to know the decisions that the technocrats are making. The very declaration of ANS, Inc. as a non-profit raises its record and actions to the highest standards of public scrutiny.

Of course it is speculation to wonder whether in taking a long time to file for 501(c)(3) clearance with the IRS, ANS wanted to buy 27 months of time free from the scrutiny that release of a Form 990 would entail. However, because the existence of ANS has been controversial from the very beginning, one would assume that they would be squeaky clean in all their actions. When they also fail to file required Annual Reports - especially given their resources - it does raise one's suspicions.

It seems reasonable to ask under the conditions outlined here whether readers of the *COOK Report* would do business with this corporation? Surely it is incumbent on the NSF to know with whom they are doing business? Now the NSF will say with MERIT, Inc. not ANS. However, I would question whether MERIT, Inc. can serve as a buffer for the NSF because MERIT, Inc. after all is one of the founding members of ANS.

Some Additional Questions

Does Congress know with whom it is dealing when it approvingly cites ANS' role in the May 1991 Report on S217?

What is the rationale of the National Science Foundation when it pays ANS founding member MERIT an extra \$7 million dollars a year for a backbone that apparently has yet to meet fully its advertised functionality? When MERIT gets the check from the NSF does it pay ANS Inc. or ANS CO+RE? What would be the benefits to ANS Inc of the first versus the second action?

When an ANS salesman makes a call on a Fortune 1000 company, does he bill ANS or ANS CO+RE for his expenses? When the same salesman calls on Harvard, whom does he bill? For

(continued p.11)

Realistic Computer Networks for K-12 Science and Mathematics

by George L. Johnston, Ph.D., Research Scientist
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Editor's Note:

At the end of April FCCSET called a Washington DC meeting of people involved in k-12 math and science education and k-12 use of the Internet. The meeting apparently was partly in response to the lobbying efforts of the Community Learning Network. What follows is George Johnston's presentation to that meeting.

Introduction

Paper prepared for the Conference on Telecommunications in Mathematics and Science Education Federal Coordinating Council on Science, Engineering and Technology Committee on Education and Human Resources Educational Technology Working Group April 30, 1992

Approximately two years ago I began to think about the use of computers, bulletin board system (BBS) and computer conferencing software, modems, telephone lines and computer networks for K-12 science and mathematics education. Shortly thereafter, I began to collaborate with Dave Hughes of Colorado Springs, Colorado, a pioneer in on-line communications for education and other purposes, to explore the possibilities in science and mathematics.

Dave Hughes is credited in the research literature with being the first person to use computer conferencing to teach a college course for credit. In 1989 he developed Big Sky Telegraph, a modem based, Unix architecture, store and forward network for the recertification of teachers in one-room schools, and a variety of other educational and community and economic development purposes in Montana. A principal subject of our collaboration has been a one-semester high school course on the science and mathematics of Chaos (an elementary introduction to nonlinear dynamics), which is now being delivered for the third time, to teachers and students in Colorado, Montana and Wyoming, by

means of a store and forward network organized by Dave Hughes. It now incorporates MS-DOS based "Fido" type BBSs linked to the Unix system and to the Internet as well.

At the outset, I wish to make two recommendations for action by the Federal government that can be implemented realistically in the 1993-1994 time frame within available funding. The remainder of my presentation will be devoted to presenting information that supports these recommendations.

Two Recommendations for Action by the Federal Government

The first recommendation is that the Federal government support cost benefit studies to illuminate particular issues concerning the development of networks for computer-mediated communications for K-12 education. In particular, such studies should focus on the dichotomy between network architectures and computer and communications equipment required to achieve a high degree of connectivity to Internet resources and real time messaging, on the one hand, and architectures and equipment that place primary reliance on dial up connectivity over public switched telephone networks, and store and forward messaging, on the other. These two alternatives represent extremes on a manifold spectrum of networks that can be implemented. The reasons for recommending such studies include, but are not limited to, issues of relative cost which involve the danger of massively aggravating the division between information-rich and information-poor segments of our society in a time of economic stress to almost all of education.

I do not wish to be understood as opposing an important role for K-12 on the Internet. On the contrary, I have

lobbied energetically in Congress for amendments to legislation concerning the NREN that would ensure such a role, and I continue to lobby for further legislation to correct shortcomings in the Gore bill that was recently passed.

For the reasons that I will present, however, it is necessary that there be an overall understanding of the costs and benefits of the spectrum of network alternatives facing K-12. The Federal government should support studies that can promote that understanding. In arguing the case for such studies, I will present a case for the "low end" networks, but networks which can evolve progressively into ever more powerful "high end" -- and interconnected -- networks, because I believe that they are not receiving adequate attention from Federal policy makers at the present time. In fact, they are being treated for the most part with scorn or silence.

The second recommendation consists of two parts: The first is that the Federal government should support studies to determine the best means to provide in the near term an economical, interoperable symbolics, graphics and drawing capability for computer-mediated communication among a reasonable range of types of computers and networks that are used in K-12; the second part of this recommendation is that the Federal government should then provide financial support to conduct or complete the development of software or other facility to provide such a capability at costs that are reasonable for wide distribution within K-12.

In arguing for the second recommendation, I will present a case for the support of development of NAPLPS-based terminal emulation and drawing software because it is the best solution that I am aware of. I believe that it is not receiving adequate attention from Federal policy makers at the present time. In fact, like the "low end" networks, it is being treated with scorn or silence.

Arguments in Support of the First Recommendation

Network architectures that place primary reliance on dial up connectivity over public switched telephone networks, and store and forward messaging, such as Big Sky Telegraph, FrEdMail, K-12Net, and others, seem to be out of favor with K-12 network policymakers in the Federal government. On the other hand, in some states, such as Montana, they are the architecture of choice, as measured by recent state expenditures. Despite their obvious limitations relative to architectures that achieve a high degree of connectivity to Internet resources, they should not be discounted. They are able to use a wide variety of platforms, including low-end computers that are in the schools now and are likely to remain in the schools for a long time. Increasingly, they can be connected to other networks through gateways that are being developed. Admittedly, the availability of telephone lines in schools is a problem -- perhaps the principal problem of K-12 computer-mediated communications -- but the cost of alternative connections is certainly not minimal.

Questions of economics are always of great importance in K-12. In the present economic and government budgetary climate, they assume even greater importance. If high-end systems are imposed, a substantial fraction of computers in schools will have to be replaced. This replacement will occur preferentially in schools and school districts that are relatively wealthy or are otherwise favored by circumstances such as proximity to a government laboratory or a technically sophisticated research university. Such circumstances involve the danger of massively aggravating the division between information-rich and information-poor segments of our society in a time of economic stress to almost all of education.

If a commitment to high end equipment is imposed initially, everyone is forced to have equipment which is more sophisticated and expensive than most of what is in schools at the present time. Cost estimates vary, but it is clear that the cost will be prohibitive. Better computers and communi-

cations equipment should, and will, come to K-12, but a massive upgrading of equipment is not affordable at the present time.

. . . the Federal government [should] support cost benefit studies to illuminate particular issues concerning the development of networks for computer-mediated communications for K-12 education. In particular, such studies should focus on the dichotomy between network architectures and computer and communications equipment required to achieve a high degree of connectivity to Internet resources and real time messaging, on the one hand, and architectures and equipment that place primary reliance on dial up connectivity over public switched telephone networks, and store and forward messaging, on the other.

Recently I heard a Federal government policy maker offer as a prime example of serious mistakes that might occur in decision making about K-12 networking a decision by a state to "buy modems." I responded that a mistake of comparable seriousness might occur if a state decided to "buy routers" and then developments in the commercialization and privatization of the Internet led to a situation in which the mid-level networks were no longer able to continue to offer the low-cost access to Internet connections that many of them now offer. In March, 1991 I presented testimony before House Science Subcommittees warning of such a possible danger.

In addition, earlier in the day of the modem-router disagreement, I heard NearNet personnel urging personnel of schools and school districts that expect to obtain Internet connections through NearNet to plan to be able to support the connections themselves within one to two years. So, in addition to questions of equity of access, there are questions about the absolute affordability of a massive move to high-level Internet connections of the forty million K-12 students and one-hundred ten thousand schools in the U.S.

There are also issues of progressiveness and the appropriateness of technology. If you put a child in an F-15, he or she may with good fortune learn to fly, but will not learn the theory of flight as well as if he or she had begun to learn to fly in a glider. To continue the flight analogy, you don't need a Concorde for a shuttle run between New York and the District of Columbia. With a simple bulletin board system and a modest computer, young children can learn both subject matter and techniques of telecommunications. The same is true of teachers.

And we shouldn't delude ourselves about the steepness of the learning curve. Recently, Dave Hughes pointed out to me the fact that, after a year and a half, I still haven't mastered completely all the features of the simplest bulletin board systems. One shouldn't confuse the power of technology with the learning process. Shoving a child through the front door of the Library of Congress will accomplish little if the child doesn't know how to read or to locate resources in a library.

The Internet -- whose interfaces were never designed for non-technical persons -- will require years of additional development before the average K-12 teacher and his or her students will be able to tap more than a tiny fraction of its costly resources. Much of this development will be necessary at multiple universities where local level access to the Internet is gained. The two technical functions that are not readily possible on an interconnected remote system, like a BBS, are the ability to log into remote systems while connected (telnet) and do a more limited connection for fetching distant resources (ftp). The other function is electronic mail. The number of times it is necessary for a student to directly log into a powerful distant computer via the Internet, such as a supercomputer, is quite small when compared with the use of the Internet by large numbers of students for more routine functions which all bulletin board systems incorporate.

The decline, over several decades, of the tradition of tinkering in the U.S., has profound implications for our scientific, technological and industrial competitiveness. In the Twenties, the cheapest way to gain access to the miracle of radio broadcasting was to build a crystal set. The Model A Ford and other cars became the building blocks

of hot rods. Amateur radio, and then microcomputers, provided other opportunities for Americans of all ages to gain technical mastery through tinkering. All of these opportunities have become less accessible, largely as a result of increased technical sophistication, frequently manifested in increased integration.

I was told recently by a well-informed observer of amateur radio world wide that many Japanese high schools offer extensive courses on amateur radio that emphasize both fundamentals and techniques of construction. In the last thirty years, amateur radio activity among the general population and amateur radio clubs in schools in the U.S. have both declined precipitously. My informant drove his point home by stating: "In the U.S. they learn to play Nintendo; in Japan they learn to build Nintendo."

In making decisions about the level of computer and communications technology that are appropriate for K-12, these considerations are relevant. If the technology is so sophisticated that it is treated by students and teachers only as sets of black boxes, valuable opportunities for tinkering will be foregone. Furthermore, the fear of electronic vandalism compels most system administrators to severely limit access to the full power of their large networks. Tinkering with a local BBS and learning how to interconnect it not only avoids some of these problems, but is good education for curious American youngsters, and their teachers and computer coordinators.

School, school district, and state education administrators must see the value of telecommunications technology if it is to be adopted in the schools. In the U.S. they are the individuals who make the purchasing decisions. If they see value at the low end, and by being interconnected to the high end through low-end systems, glimpse the power and sophistication of the Internet, they and budget-conscious financial administrators will in time demand equipment of higher sophistication. If high-end, relatively expensive equipment is presented to them initially without concomitant experience of its value to schools, they will be unwilling to make decisions to purchase it.

Even persuading a school board to pay for the installation of voice grade lines to schools is, today, quite difficult. And installing dedicated high bandwidth circuits to these same schools at their expense is often impossible. Starting, in

all but the exceptional case, with microcomputer based telecommunications, interconnected bulletin boards or desktop Unix systems is a sensible next step in connecting all one-hundred ten thousand schools in the US to the rest of the world.

Arguments in Support of the Second Recommendation

As I stated above, the second recommendation concerns the best means to provide in the near term an economical and interoperable symbolic, graphics and drawing capability for computer-mediated communication among a reasonable range of types of computers and networks that are used in K-12. As I also stated above, in arguing for the second recommendation, I will present a case for the support of development of NAPLPS-based terminal emulation and drawing software.

Communicating science and mathematics on line, with only ASCII text (which permits crude character graphics) and photocopies of a few scientific papers (with figures) distributed in advance by snailmail (U.S. Mail), as I have been doing in the Chaos course, obviously leaves much to be desired. One longs for the ability to step up to a virtual chalkboard to draw simple diagrams and write equations, and have them seen in classrooms and homes, rich and poor; on Macs, IBM compatibles, and (if possible) Apple II's; through grass-roots Fido store-and-forward networks as well as the Internet. And to receive such transmissions. It's a natural next step. It's THE natural next step.

When I became convinced that Dave Hughes was pursuing a valid approach to the provision of such a capability in his advocacy of NAPLPS-based terminal emulation and drawing programs, I naively expected two developments. First, there would be a discussion of competing alternatives for the provision of that basic capability and the development of a consensus concerning the best approach. I expected that NAPLPS, the ANSI and Canadian Standards Association videotex/teletext presentation level protocol syntax, would be a strong contender.

Among other considerations to recommend it was the fact that IBM uses NAPLPS as the basis for the IBM-Sears Prodigy graphics software, albeit in crippled, non-interactive, form. Nev-

ertheless, I kept looking for standards-based, as opposed to proprietary, alternatives for the provision of two-dimensional graphics, symbolics and drawing that would be economical in terms of computer and communications resources. I have yet to find one. I would be delighted to be embarrassed by the disclosure of a superior alternative.

And second, I expected that there would be financial support from government agencies, private foundations or private industry for the development of appropriate software under conditions that would make it affordable for K-12, and able to be implemented on computers and networks currently found in schools and homes, not just on computers and networks to which they will not have access for some time. What I have observed is quite different.

A sense of the importance of such a generic and interoperable graphics, symbolic and drawing capability seems to be almost absent among individuals and organizations well situated to help bring it into existence. Instead, several alternative priorities seem to be crowding it out.

One is a determination to reach, through pilot studies utilizing methods of educational research, conclusions about effective approaches to educational telecommunications. This determination flies in the face of important realities, such as the fact that the current state of educational telecommunications is closer to the Wright brothers' biplane than to two advanced fighter-bombers competing for selection and mass production by government.

The present situation calls for more support for the Wright brothers' experimentation, not the bureaucrats' selection process. The "scientific" conclusions that such studies will establish will be of dubious value in technological and organizational environments substantially different from those in which they are conducted. And those projects will be expensive Potemkin Villages that will tend to collapse soon after their funding ends.

The present situation calls for more support for the Wright brothers' experimentation, not the bureaucrats' selection process. The "scientific" conclusions that such studies will establish will be of dubious value in technological and organizational environments substantially different from those in which they are conducted. And those projects will be expensive Potemkin Villages that will tend to collapse soon after their funding ends.

Another competing priority is an excessive emphasis on deploying extremely advanced technology, such as workstations and high bandwidth network connections to supercomputers. (Note that I include the word "excessive": I certainly do not deny that there is a role for this level of technology.) Justifications for this emphasis include an assertion that "the kids" are products of visual and celebrity escalation by TV and video games that leave them incapable of responding to anything less than state of the art technology and famous names, whether Madonna or Cray.

The hidden agenda here seems to be development of a grassroots constituency for High Performance Computation and Communications among a population that wouldn't recognize a massively parallel computer, a T-3 bit pipe or a sparse matrix if it bit them. In other words, what seems to be involved is an Executive Branch analog of Senator Gore's invocation of the little girl in Knoxville logging into the Library of Congress to do her research on dinosaurs.

And yet another competing priority is a preference in some quarters for idiot-proof communications software fundamentally structured for the delivery of large-scale pre-programmed educational "units" to huge numbers of classrooms with minimal initiative or intervention by teachers. The "idiots" are the teachers, not the students, who are merely young. Like the "Plumbing Problems of the Gods" cartoon in *The New Yorker*, this approach conjures up visions of giant pipes carrying in this case, not water, but golden grains of knowledge, or at least experience. (Admittedly, the flow would be two-way: students would transmit their contributions to the process.) The pre-programmed educational "units" would presumably triangles, etc. There is a freehand drawing option and there are character tables, some of which can be filled

with symbols created for a particular application. A bit-mapped image can be converted into a NAPLPS file of high resolution. Obviously, the size of a NAPLPS file will depend on the complexity and detail of the image.

The hidden agenda here seems to be development of a grassroots constituency for High Performance Computation and Communications among a population that wouldn't recognize a massively parallel computer, a T-3 bit pipe or a sparse matrix if it bit them. In other words, what seems to be involved is an Executive Branch analog of Senator Gore's invocation of the little girl in Knoxville logging into the Library of Congress to do her research on dinosaurs.

Imagine my surprise and relief when everyone to whom I gave a demonstration seemed to be favorably impressed. The reasons for this reception were best articulated by one person, who holds a responsible position in the area of advanced visual presentation. As an image of an eagle flying over a river valley surrounded by craggy peaks was painted on the screen (painfully slowly, I thought) he repeatedly exclaimed with approval about the speed of the process and expressed a desire to understand better the software that was drawing the image. He explained that in the Media Lab, even with far larger bit pipes than the 2400 baud modem we were using to view Native American art executed in NAPLPS and resident on MetaNet in Arlington, Virginia, there is always concern about the slowness of transmission of their (bit mapped) images, even with compression.

He also explained that beyond a certain image quality, the principal effect of increased resolution is to distract the viewer. Instead of continuing to increase resolution indefinitely, as has been until recently considered desirable, it is preferable to maintain the important parts of an image in focus and to place everything else slightly out of focus. We can't do this in exactly the same way with NAPLPS images, but at least they are not at a disadvantage relative to ultra-high definition images. In other words, "less" may actually be "more" in presentations of graphical images for educational purposes. Dave recently became aware that a similar

conclusion has been reached by some organizations responsible for developing simulations involving video displays that are used to train military personnel for combat operations such as Desert Storm.

Where are we now? No thanks to the establishment, a lot further along than I would have expected a year and a half ago. The principal reason for this is Dave's bravura performance, financed out of his own pocket, in convincing a few Canadian companies that have developed NAPLPS terminal emulation and drawing software to make certain of their low-end products available for educational use at prices that are manageable for K-12. Much more needs to be done. These products, which were developed for videotex applications, although adequate to demonstrate the appropriateness of NAPLPS for K-12 applications, are not satisfactory for operational use in K-12. Typically, they don't implement the complete NAPLPS standard: One product implements one subset of the standard; another implements another subset. They don't offer user-controlled features applicable to the range of computers, as well as networks, found in the K-12 environment.

And of late he [Hughes] is negotiating to hire software developers in the Former Soviet Union, whose services can be obtained at low dollar cost, to accelerate the development. It would be a bittersweet irony if unemployed programmers in that troubled land were to contribute more significantly to the effective use of telecommunications for K-12 science and mathematics education in the U.S., than the well-endowed institutions that are working so hard to reverse the well-documented decline of U.S. education in those areas.

Dave Hughes, ever the visionary, ever the optimist, and ever the hands-on practitioner, is now trying to obtain bits and pieces of funding to continue the necessary development. And of late he is negotiating to hire software developers in the Former Soviet Union, whose services can be obtained at low dollar cost, to accelerate the development. It would be a bittersweet irony if unemployed programmers in that troubled land were to contribute more

significantly to the effective use of telecommunications for K-12 science and mathematics education in the U.S., than the well-endowed institutions that are working so hard to reverse the well-documented decline of U.S. education in those areas.

When Dave first told me about NAPLPS software, I felt very tentative about it. After all, if it was so wonderful, why wasn't it already out there? I now understand that the demand for in-

teractive symbolics and graphics software that can be satisfied by NAPLPS is only now emerging. It comes from people like me who are actually involved in science and mathematics education on-line in a non-proprietary, multi-platform, and cost-constrained environment. But if our stated intention to use computers and networks to improve K-12 education is realized, there will be more of us soon. And we will need a symbolic, graphics and drawing capability. Without such a

capability, the enormous amount of effort now being devoted to developing computer-mediated communications for K-12 science and mathematics education will be of severely diminished benefit.

Disclaimer

The opinions which I have presented here are solely my own, and do not represent those of my employer or any other individual or organization.

COREN (continued from p. 1.)

NAP's will also allow mid-levels and non-federal service providers to peer with one another, which will enhance and extend the national infrastructure and connectivity without affecting the federal networks."

In other words the NSF views Network Access Points (NAPs) as places where the regionals CAN BOTH interconnect to the IINREN developmental, precompetitive backbone AND get other commercial backbone services not subject to acceptable use strictures.

MCI's VP Edgerton on April 21 described the Coalition of Research Networks (COREN) as an arrangement between SURAnet and MCI to provide bit pipes for mid-levels and for backbone connectivity *between* mid-levels.

It was interesting therefore to read at the end of the IINREN Plan that:

"NSF will immediately assume responsibility for FIX East, currently operated by SURAnet at College Park, Maryland. The NSF engineering group (NEG) has a report in progress which details a FIX-East upgrade implementation plan to be completed by Summer 1992. NSF's active oversight for FIX-EAST should commence in June 1992 with the upgrade of FIX-East facilities and the initiation of a Network Access Point (NAP) beta test project at FIX-East."

Although NSF is assuming the responsibility, one would imagine that MCI and SURAnet will be involved in the project. Is it just a coincidence that MCI as the provider of the trunks for backbone, out of all 32 mid-levels, chooses SURAnet to partner with in providing the COREN service? Who provides FIX EAST? Are the routers of FIX EAST located at SURAnet? Have

SURAnet employees been responsible for maintaining the connection from a technical point of view?

FIX EAST will be the beta test site for the Network Access Point program - a program that will encourage mid-levels to get separate commercial backbone like connections between them. MCI says that COREN will provide backbones for and between the mid-levels. At the end of the first week of May neither MCI nor SURAnet would answer further questions as to the purpose of COREN. Indeed at that point the purpose wasn't clear to outsiders. But now that the IINREN implementation plan has given its blessing to the building of new backbones between the mid-levels, may one ask those involved if MCI will be the IXC for the Network Access Program beta test?

MCI has provided the backbone bit pipes for NSFnet since the T-1 went operational in the summer of 1988. Now the NSFnet has come up with a new level of backbone provisioning. MCI, before the plans are even announced, appears to have a marketing plan and arrangement in place to take advantage of the new environment. I heard mention of COREN as early as February of this year. Either we have an interesting coincidence, or MCI appears to have had considerable advance notice of a significant business opportunity.

Of course there is nothing illegal about any of this and of course Sprint, WillTel, AT&T, RCI and other interexchange carriers can now get in the game and "compete" against what MCI has prepared.

Or can they? Is the MCI head start irrelevant?

ANS' Point of View - Editor's Note

Several people who do not normally receive mailings from ANS, received an article "**From the President and CEO ... Allegations Answered**" in an ANS newsletter and contacted me about it. Apparently this material in a free newsletter is copyrighted by ANS. However, the copies I received were excerpts and had no copyright information.

Since it has clearly been placed in the public domain as a free newsletter by ANS, I believed that I could republish it here along with my own comments. Susan Eldred informed me by electronic mail today (May 27) that it was copyrighted and I did not have ANS permission to use it. Al Weis also denied me permission.

Consequently I have removed Al's text. The bold bracketed numbers were my interpolation into the ANS text. They should be used by readers to find my comments on that point in the text that I add as my rebuttal. (I insert instead just a pointer to enable readers with access to the newsletter to identify what my references are. The white space is left because of my removal (at ANS' demand) of Al's text.)

In the third sentence Al references "secret agreements" with the National Science Foundation. [1]

First sentence second paragraph says allegations raised are totally false. [2]

The last sentence of the second paragraph says that the accusations are "impeding . . . the development of high speed data networking in this country." [3]

What Is ANS? (cont. from p.5)

purposes of accounting to the IRS what counts as an ANS CO+RE connection to the network? According to information released by MERIT, ANS recently connected J.P. Morgan, 60 Wall St, NY, NY to the network. Do the funds from this connection go on the books of ANS, Inc. or on the books of ANS CO+RE?

Who should be exercising "due diligence" regarding ANS? Congress? The National Science Foundation? These are a few questions to which it would be useful to know the answers.

There is a sense among some people who have been deeply immersed in these developments that the outcome was pre-determined quite a while ago. Some believe that the pre-determination was published in the pages of *IEEE Spectrum* on February 1, 1988. There Gordon Bell, who had recently finished a tour of duty at the

National Science Foundation wrote with reference to the proposed National Research Network:

"Both the executive and legislative branches of the Federal government are simply incapable of setting up a line item to be funded and administered either by an agency or inter agency group, even though the facility would support the entire research and education community. A radical approach though could work: select a private sector company to manage and develop the network, and provide it with a budget, to which every agency would contribute under NSF guidance. (Each would list its support for the network as a single line item in its budget. Each would relinquish control of its networks to the manager.) Assure the network manager of steady support — both fiscal and political — for the first five operating years or so of the network. And instruct the manager to devise a plan for gradually shifting all operating costs to users. . . [T]he national research network . . . could be funded

in this fashion."

It appears that Gordon Bell was suggesting that the National Science Foundation pick a winner for what has since become the NREN. The Congressional Hearings of March 12, 1992 showed some of the problems that this stance has created. Unfortunately problems that are still festering seem to have been glossed over. *The COOK Report* believes that the NREN is too important to be implemented behind closed doors.

A Postscript: As we were going to press Susan Eldred called back and stated that ANS had asked its accounting firm to find out what had happened to the Annual reports. Asked about the Directors for CO+RE, she said they were a subset of the eight ANS Directors. When asked which of the eight she stated that she would prefer not to say which. She did not believe that ANS was required to make this information public.

ANS Point of View (from p.10)

The third paragraph fourth sentence states: "Therefore, the deployment of T3 was part of the original plan, and was always a matter of public record." [4]

Sixth paragraph second sentence: "The company has put forth a plan proposing that regional networks become commercial service providers by exchanging commercial traffic over the ANS T3 backbone." [7]

First sentence seventh paragraph says that ANS is committed to helping K-12 classrooms [8]

Fourth paragraph final sentence: "The allegations that government-owned property was transferred to ANS is absurd." [5]

Fifth paragraph final sentence: "Any competitive advantage held by ANS is due to the experience gained in building the T3 network, which involved considerable technical and financial risks." [6]

Fourth sentence seventh paragraph: "Unlike the CIX, we believe that no network should incur additional costs as a result of agreeing to carry commercial traffic and not be able to recover them." [9]

Ninth and tenth paragraphs omitted.

Editor's Comments:

[1] AI refers to the letters first published on Com-Priv on December 8, 1991 and republished on page 13 of this issue.

[2] See point 5 below.

[3] Some specificity of how they are

impeding the development of high speed networking would be welcome. Some people feel that ANS's use of the backbone to develop IBM router technology is inhibiting the development of high speed data networking in the US.

[4] Here is what page 14 of the NSF provided reprint of the MERIT proposal says: "At the beginning of 1990, we expect to begin the transition into the NSFnet's second phase, incorporating into it D-3 capable software. If demand for higher rates exists, and funding for the additional hardware and transmission becomes available, we have target the beginning of the deployment of a higher speed network for that time."

So MERIT, IBM and MCI suggested that they would *like* to go to a higher speed network in 1990, *if* the need existed and *if* there were additional monies to cover the costs. Did the NSF proposal ask respondents to include plans to expand to D-3? Or was MERIT just farsighted in suggesting that it might be a good idea? Al's wording leaves the impression that bidders all knew that an increase to D-3 before the end of the agreement would be a likelihood and that all proposals should have included plans for increase to D-3.

To say that the paragraph cited above made the increase to D-3 "always part

of the plan" is stretching. The wording is very very tentative. Again the question is whether the NSF proposal request made it clear to bidders that an increase to D-3 before the end of the five years was a likelihood? If it did not, it seems understandable that there should be complaints. Certainly I can see nothing in the proposal that would appear to justify the NSF roughly doubling its payment to the winner without going back to bid.

[5] Al is correct in asserting that no U.S. Government physical property was given by the NSF to ANS. Steve Wolff's letter of September 10, 1990 shown on page 13 says nothing about the transfer of physical property. Steve does agree to MERIT's assigning the existing joint studies to the new corporation and to MERIT's subcontracting services to the new corporation, and to MERIT's allowing the new corporation to make commercial attachments to the backbone.

What has been misunderstood is that, while the backbone itself wasn't given away, the NSF did allow the holder of its cooperative agreement to give *control* over a major portion of the backbone that Federal taxpayer dollars had paid for to a new and unknown company whose motives and status nearly two years later remain unclear.

The first agreement states that the NSF, and MERIT will agree on means

of technical compliance. The second agreement states that the NSF, MERIT, and ANS will agree on means of technical compliance. This seems to imply some sort of review procedure and accountability. *What has become of this part of the agreement?*

[6] Would any member of the IETF or FARnet without any interests attached to the success of ANS agree to this statement?

[7] I would like to hear from any Director of a mid-level network who believes that ANS' plan for "com-bits" discussed on com-priv in December would have made his or her network a commercial service provider without threatening its long term interests. Mid-level networks already are - by and large - commercial service providers.

[8] What exactly is ANS doing on behalf of k-12?

[9] ANS has never made clear what the extra costs of carrying commercial traffic are. The CIX apparently doesn't understand what these costs are because it apparently feels no special need to charge for them.

At the end of the year of trial interconnection between the CIX and ANS, the *COOK Report* predicts that the CIX position is unlikely to change.

Discussion of Issues Raised by May 15th FNCAC Meeting to Be Featured in July COOK Report.

The *COOK Report* has spoken in depth with an attendee of the May 15, 1992 Federal Networking Council Advisory Committee meeting. From that conversation it has compiled a 3000 word summary of the day long discussions.

The picture that begins to emerge is disturbing. The meeting, postponed from March 92, was called on such short notice that only 9 of the 21 members could attend.

A Byzantinely complex group of new HPCC committees, groups and task forces working on key plans for the network was outlined. The NSF made

plain that it is more interested in its Advisory committees views on some matters than on others. One FNCAC member apparently even complained that the FNC management plan gave the Advisory Committee too much freedom to speak on on any networking issues rather than on just those which the FNC requested the advice of its Advisory Committee!

Enough detail about Network Access Points emerged to show just how nebulous the concept is. Mid-levels who care to connect to them will apparently have to pay 100% of the connection cost by 1996. It does not appear to be clear whether the cost of interconnection will be by size of bit pipe or by amount of traffic sent. When asked how much it would cost a mid-level to hook to a Network access point, a representative of the FNC replied that he hadn't a clue.

One of the most disturbing moments apparently came when a highly re-

spected employee of an entity that develops standards for the Public switched Telephone Network noted that he was hearing a rather far reaching plan for data communications on a national level that would set precedents and affect a range of users far beyond the boundaries of the NREN. Therefore it should be reviewed by broad policy making organizations like the FCC and perhaps the telecommunications sub committees of the Congress.

Apparently the response was that the plan was only an opportunity to connect and that there was nothing forcing the national networks to do so. they could take it or leave it.

Issue 4 of the *COOK Report* will appear in about a month. It will feature a discussion of what was learned at the FNCAC May 15th meeting. The editor invites those who would like to have a part in that discussion to contact him at cook@tmn.com.

The NSF Agreements With MERIT, Inc.

=====

NATIONAL SCIENCE FOUNDATION

1800 G Street, NW
Washington, DC 20550

Division of Networking
and Communications
Research and Infrastructure

September 10, 1990

Dr. Douglas E. Van Houweling
Merit Computer Network
5115 I.S.T. Building
2200 Bonisteel Blvd.
Ann Arbor, MI 48109-2099

Dear Doug:

This letter responds to yours of the 28th June, concerning Merit's plans to establish a not-for-profit corporation with its partners.

NSF agrees to MERIT's assigning the existing joint studies with MCI and IBM to the new corporation.

NSF agrees to MERIT's subcontracting services to the new corporation. Although the new corporation may thus become the actual provider of the NSFNET Backbone, NSF will continue to deal with MERIT under the terms of the existing Cooperative Agreement.

The specific concurrence of NSF's Division of Grants and Contracts has been obtained in the above two paragraphs.

NSF agrees that the new corporation may solicit and attach to the NSFNET Backbone new users, including commercial users, and may connect them to new or existing nodes on the Backbone, with the understandings that:

- 1) such users will reimburse the new corporation for at least the full average cost of the connection, the added traffic, and additional related support, and
- 2) the reimbursements will be used to enhance the network infrastructure and services, in order that the level of service provided by MERIT under its Cooperative Agreement with the NSF not be diminished.

NSF and MERIT will agree on the technical means of compliance with 2) above.

Sincerely,

(Original Signature)

Stephen S. Wolff
Division Director

=====

Second Agreement

Message: 8667397, Reply to: 8663885, 3 lines
Posted: 8:56pm EDT, Fri May 24/91
Subject: ANS commercial traffic
To: steve@cise.nsf.gov
>From: Eric M. Aupperle

Steve, this acknowledge's your note about commercial traffic on NSF sponsored gateways to the T3 network. I've shared it with Al Weis. Have a good weekend. Eric

Message: 8663885, 22 lines
Posted: 12:32pm EDT, Fri May 24/91, imported: 12:35pm EDT, Fri May 24/91
Subject: ANS commercial traffic
To: Eric M. Aupperle, ema@merit.edu
Cc: jcavines@nsf.gov, steve@cise.cise.nsf.gov
>From: steve@cise.nsf.gov

This is to confirm our agreement on the flow of commercial traffic across the NSF sponsored gateways to the T3 network.

NSF agrees that ANS may move commercial traffic in both directions across the NSF sponsored Backbone gateways, providing that:

- (1) ANS recovers at least the average cost of the commercial use that traverses the NSF sponsored gateways.
- (2) Excess revenues recovered above costs for this use after tax will be placed in a pool to be distributed.
- (3) An ANS resource allocation committee will be formed with representation from the participating NSF sponsored gateway management, other network organizations, the NSF and ANS to distribute those funds with the objective of further building national and regional infrastructure, and
- (4) MERIT and ANS ensures that the attachment and service sponsored by the NSF under Merit's Cooperative Agreement with the NSF is not diminished.

NSF, MERIT and ANS will agree on the technical means of compliance with the points outlined above.

Subscription Information

Twelve "hardcopy" issues of the Cook Report will cost \$75.00 for individuals and companies or government agencies with operating revenues of \$10 million or less per year. The cost for larger entities is \$300.00. The Cook Report will be available in electronic form to subscribers who sign a hardcopy pledge not to redistribute it further. Subscribers at the \$300 level will receive for no extra charge the 35 page (170,000 characters) desk top published report: *The National Research and Education Network: Whom Shall It Serve?* Others may order this document separately at \$25..

Subscriptions are payable by check to Gordon Cook. Foreign hardcopy subscriptions are \$125.

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