APPENDIX A:

REFORMING THE FINANCIAL SUPPORT SYSTEM FOR UNIVERSAL SERVICE IN TELECOMMUNICATIONS[1]

Summary of Proposal
Subcommittee on Universal Service Methodology and Application
Eight Annual Aspen Institute Conference on Telecommunications Policy

I. INTRODUCTION

A universal telecommunications service goal, simply defined, is a public policy to spread telecommunications to most members of society, and to make available, directly or indirectly, the funds necessary. In the past this has usually been accomplished through the establishment of a monopoly system in the provision of telecommunications, with the monopolist's profits used to support some of its endusers, especially residential and rural customers. More recently, competitive inroads into most segments of telecommunications have limited the ability to generate the funds for such internal cross-subsidies. Since the demands for funds for maintaining universal service have not declined, the old system has been propped up Rube Goldberg style. It has tried to conduct social policy with the tools of industrial structure policy, and has been less and less successful in either. Similarly, upgrade plans for telecommunications infrastructure have been affected by the question whether some segments of society would fall behind. For the longer term, therefore, the question must be faced squarely: if we want to continue to assure the electronic interconnectivity of all members of society, how will we pay for it?

Of course, increased efficiency, competition, new technology, and a narrower targeting of benefits may well reduce the magnitude of the necessary money. But these measures will not likely do away with a core of politically and socially mandated support to rural America, the poor, emergency 911 services, relays for the hearing impaired, and other services deemed valuable to society. We can disagree about what services might be included, and what financial magnitudes would be involved, but not that it would be nonzero. Therefore the question still remains: how do we pay for the required subsidy?

Our proposal operates on the premise of neutrality—equal rights and equal burdens to all carriers in the network system. Whether the carriers are traditional or new, they would all contribute financially to the level of universal service support decided upon by society through the political and regulatory system, and they would

have full rights to enter and compete. The proposed system is not a transfer mechanism per se but primarily an accounting method to assure a fairness of burden. The existing support system need not be scrapped, though it could be. Existing contributions are taken into account and credited. Level playing field competition becomes possible. Customers, including those that are subsidized, are able to choose among carriers. Competition, innovation, and universal service can coexist.[2]

II. FINANCING TODAY'S UNIVERSAL SERVICE SYSTEM

The financing of universal service includes today a multi-varied collection of contributory elements.

1. Inter-carrier Transfers

- *Interexchange carrier access charges.*
- *High cost fund.*
- *Alternative Local Access Providers access, interconnection, and collocation charges.*
- *Toll Pools.*
- *Long Term Support ("LTS").*
- *Lifeline Contributions.*

2. Inter-Customer Transfers within a Carrier

- *Higher subscription charges on business lines than on residential lines.*
- *Above cost prices for business-oriented services such as leased lines.*
- *Above cost charges for features such as touch-tone, call forwarding, caller-ID, etc.*
- *Averaged access charges.*
- *Information provider charges.*
- *PBX customers trunk charges.*
- *Averaged local subscription charge.*
- *Short-haul long distance calls.*

3. Direct Governmental Contributions

- Rural Electrification Administration loan guarantees.

To conclude: Today's system of funding for universal service is a mix of numerous and federal and state pricing and allocation arrangements. The aggregate is a system of bewildering complexity that is intelligible only to specialized financial accountants—at best. But society at large, as well as its policy-makers, have long lost the ability to see the big picture, or to judge the present system by some criteria of fairness of efficiency. Furthermore, the system is becoming more complex as it struggles to achieve the old goals without new tools. As competition increases in local and short-haul traffic, the old system comes under major strains. It has to change. But how?

III. FINANCING THE UNIVERSAL SERVICE SYSTEM: THE OPTIONS FOR TOMORROW

1. Principles for a Reformed Universal Service: Seven Neutralities and Five Friendlinesses

Any new type of revenue raising measure should meet the following criteria as much as possible. First, seven "neutralities" should be met or approximated.

A. *Competitive neutrality*. A new financing system should not skew the relative market strength of any carrier.

B. *Structural neutrality*.[3] It should not favor or disfavor integrated or unbundled provision of a service.

C. *Technological neutrality*. It should not favor any type of transmission technology over others.

D. *Applications and content neutrality*. It should not favor any particular use of telecommunications, or type of message.

E. *Geographical neutrality*. It should not burden any parts of the country disproportionately.

F. *Transitional Neutrality*. There should be no shocks or windfalls to any participants due to transition to a new system.

G. *Jurisdictional neutrality*. The new system should be integrateable into the federal-state regulatory system.

Other criteria for a successful revenue raising system are five "friendlinesses."

A. Political friendliness—for acceptability, there should be no rate shocks, windfalls, or unilateral advantages to some competitors.

B. Collection friendliness—stability in generating the targeted revenues.

C. Administrative and user friendliness. Keeping things simple is a key requirement.

D. Integratability friendliness—existing universal service schemes need not be overturned.

E. Productivity friendliness—Incentives to production efficiencies.

2. Options for Reform

In structuring a system of contributions towards universal service, these are, broadly speaking, the alternatives.

A. *Protect the system of internal cross-subsidization within the major carriers.* In a competitive system, it exposes the LECs' subsidizing customers to cream-skimming entry by new entrants.

B. *Expand access charges among carriers.* In a competitive multi-carrier local environment, there would be uneconomic incentives for carriers to avoid interconnection.

C. *Public financing: general tax revenue.* In the present budget environment this is not a realistic proposition.

D. *A sales tax on telecommunications services or equipment.* It would suffer from the political difficulty of raising a new tax, of having to deal with difficult borderline issues, and of neutrality with respect to competition, structure and application.

E. *A comprehensive telecommunications value-added tax.* It would be the most neutral of all telecommunications-specific levies, but would raise the political problem of a new tax, plus border drawing questions and enhanced service coverage issues.

F. *A net transmission account system* of debits proportional to the transmission revenue, net of payments made to other carriers, and with credits for universal service contributions made otherwise. We call this the NetTrans Account system. It is the recommended system, and we will describe its elements below.

IV. THE NET-TRANS ACCOUNT SYSTEM

At their most basic, NetTrans Accounts are not primarily a new form of *transferring* money. They are rather a way of *keeping score* that all carriers pay a proportionately similar share to the maintenance of that type of universal service which the political process has decided upon. Only insofar as some carriers may be contributing less than others would the NetTrans accounting result in transfers to and from the accounts. This system also means, importantly, that one need not (though one could) eliminate or change existing contribution programs. They are simply taken into account and credited in the process.

The system would be initiated at the same time that local competition would be fully permitted. It would also be tied to a cost-reduction mechanism of competition, so that inefficient carriers could not shift their costs to others.

The system in a nutshell:

In an independently administered universal service account, carriers are debited a flat percentage of their transmission path revenues, net of transmission charges paid to other carriers, and given credit for universal service contributions made and for subsidized users choosing its service.

The elements of this plan are now explained stepwise.

1. "Carriers"

Who and what is included in the system? Entities that provide "transmission path" services to third parties for compensation. Included are all facilities-based two-way transmission carriers with an FCC carrier identification code (CIC) that are subject to the FCC's Title II regulation (or its state equivalents), including LECs, IXCs, cellular carriers, CAPs, and satellite carriers.

Excluded are enhanced service providers (ESPs), Information Providers (IPs), resellers, intraorganizational private networks, equipment manufacturers, and cable and broadcast operators (except for their two-way telecommunications transmission services).

To levy a charge on telecommunications equipment would either require continuous line drawing problems, or it would reach far into the computer and video industries. This would likely be politically unpalatable and would go far beyond the goal or reorganizing the existing subsidy system *within* the telecommunications sector.

To include upper level, enhanced, and information services could be a levy on information and speech and as such constitutionally suspect. It would also greatly increase the number of entities subject to the account system and thus increase its complexity. And it would lead to complicated questions of what is counted as enhanced services revenues. For example, if a travel agency provides an on-line reservation ticket purchasing service without an extra charge, what is the ESP revenue it would be liable for? Would a teenager's computer bulletin board system be subject to periodic filing? These questions can be resolved, but one can reach all of these activities much easier indirectly, through the underlying telecommunications transmission they all use. Pure resellers would also be reached through the charge on the transmission services they use.

Similarly, it would be difficult to impute a revenue figure to intraorganizational "private" networks. There would be a large number of entities, administrative and, definitional problem, and the need for fundamental legislation if the system is widened. In consequence, such private networks should be treated similarly to ESPs or resellers, which they frequently resemble. Where they use other carriers' facilities, they would contribute indirectly through the charges levied against the carrier facilities. Where they use their own facilities, they could be reached by other forms of contribution to universal service, if such is desired, for example by PBX trunk interconnection charges.

Traditionally, what can be broadly called the mass media—cable television operators, broadcasters, direct braodcast satellites, wireless cable—have not been part of the support system for universal service in telephony. One cannot burden these companies and their customers without providing the benefits to them, too. They should be excluded for traditional mass media offerings. It would be a different matter if they entered telecommunications-like services, in which case such services should be included.

Also exempt could be start-up carriers or new operations within these categories, partly as a form of "infant-industry" assistance, and partly to reduce the administrative burden by including only carriers that seem to survive. Such exemption should be limited in duration, for example to three years.

2. "Transmission Path Revenues"

On the whole, revenues are a good proxy for economic activity, and they are often available as a byproduct of the regulatory process. If new carriers were to be stymied in entering the market, their revenues and thus the NetTrans obligations would be small. Transmission path revenues are those for transport plus basic switching. Symmetrically to the earlier exclusion of ESP's, omitted are enhanced services; information services; one-way services; equipment; software; directory assistance; caller-ID; and billing and collections. The NetTrans account system would benefit from the already existing requirement on LECs to separate basic revenues from "enhanced" revenues.

3. "Net of Transmission Charges Paid to Other Carriers" Who are Part of the System

An important feature of the NetTrans account system, derived from the value added tax concept, is to give credit for the cost of inputs, i.e. for transmission path inputs purchased from other carriers. (For example, long-distance or mobile carrier pay LEC's for access to customers.) This feature of the plan means that there is no accumulation of tax upon tax, or a tax upon a contribution, or a need to tax imputed value-added services and their providers, as would be the case with a sales tax. In consequence, there are no advantages to being vertically integrated across multiple stages. The various non-neutralities and inequeties inherent in a sales tax can be resolved. But when they are, the result is not a sales tax, but something similar to the proposed NetTrans system.

4. "Flat Percentage"

If we know how much of a universal service contribution we must generate in total and how much revenues the system generates, we can calculate a debit percentage.

5. "Independently Administered"

For the account system to operate equitably and without suspicion, it could not be administered by any particular industry group, or else it may shift its costs to its rivals. We recommend an inter-industry board comprising all industry segments, including large users, and representatives of the public. Such an entity would subcontract with others, such as accounting or consulting firms, for the actual operations.

6. "Credit for Universal Service Contributions Made"

At present, carriers contribute to universal service in a variety of ways. Some pay access charges that are substantially above cost. Others serve rural areas at prices that are below cost, etc. These contributions should be credited against the universal service fund debit.

One major advantage of the NetTrans account system is that is does not force an already existing subsidy mechanism to change. Nor is it dependent on such a change. A rebalancing of rates could take place, but one need not wait for it, because NetTrans can accommodate either situation. If access charges, toll pools or lifeline contributions have already been made by a carrier, they are credited. If the present hodge-podge of contribution programs should, by some miracle, be perfectly equitable in its net financial burdens on the various carriers, no additional transfers at all would have to take place.

To extend credit will require quantification. One simple way to establish it is to let the various carriers declare the value of their own contribution. One might think that this will lead to an overestimate. But if such an estimate would constitute a carrier's minimum debit for the *next* period, adjusted for growth, there would be no incentive to exaggerate, because today's overestimate on the credit side becomes tomorrows obligation on the debit side. A second and more complex method would be to evaluate the contribution by way of a formula for an average urban, suburban, and rural residential service subsidy per line, subject to an annual productivity improvement factor such as an already existing price cap mechanism. Where competition exists, this cost could not exceed the price of rivals in the same market. Also included would be high-cost fund payments, net contributions to toll pools, and other clearly accountable net contributions, e.g. to lifeline service, also subject to productivity factors.

7. "Credit . . . for Subsidized Users Choosing Its Service"

This proposal makes no recommendations as to what types of services might be supported, for how long, what kinds of users might benefit, and whether support ought to be broadbased and expansionary or narrow and means-tested. The NetTrans mechanism can support any plan. One way to proceed, after defining the benefitted class of users and services, is to provide these users with "virtual vouchers." They would choose carriers freely; and the chosen carrier would then be credited in its NetTrans account for the value of the voucher. The customers' telephone could reflect the credit, which would be fully passed on to them. These would be competitive for the subsidy.[4]

8. Jurisdictional Issues

State Jurisdiction. One question to consider is the role of the state public utility commissions in this system. On the one extreme, if the system were entirely state-based, carriers would shift operations, or at least accounting costs and revenues, according to which state offers a lower rate. The result would be a "race to the bottom" by states to attract telecommunications carriers, and inefficient operations by carriers chasing the lowest rate. The other extreme, total federal and uniform rules, is also

unpalatable, because it takes no account of regional preferences. This suggests a mixed system. Federal guidelines would establish a national system. States would have a role in the implementation, as well as could have variation on the benefits side. To include the states is not only good policy, it is also good politics, and it is squarely in the tradition of American federalism.

International. How should international transmission services be handled? The principle of contribution for transmissions services should also include international services. To apply this principle would mean that, e.g., if Sprint would bill for an international call, it would be liable for a charge against the revenues from that call, net of payments to non-U.S. carriers. Revenues due to them under the international settlements system would be subject to a U.S. NetTrans charge before it would be paid out by a U.S. carrier.

Congress. An important question is whether the new system would be a tax subject to Congressional tax legislation, and whether the subsequent support of universal service would be an appropriation subject to the Congressional budget process. The alternative would be for the measures to be part of the regulatory scheme delegated to the FCC or state PUCs. The present system is almost entirely in the regulatory category. The new system, while different, pursues the same policy goals as before, as part of reconciling the introduction of competition with the protection of universal service. Both are in pursuance of Congressional policy; in the case of universal service, the preamble of the 1934 *Communications Act* makes that clear. Congress has been on record in favor of competition, tempered only with a concern about the potential impact on universal service. Thus, for regulatory agencies to pursue this course would be squarely within Congressional directives.

For the FCC, the measure would be in the nature of integrating its already existing subsidy schemes. Participants would only be those carriers who have applied for an FCC identification number. Carriers that would not interconnect into the larger network system would not be included in the financing arrangements.

It therefore seems that the FCC would be within its delegated powers to introduce such a system. However, it would also make sense for the broad outline of the system to receive expressed Congressional and Executive approvals. But it would be a mistake to make approvals in a form that is as detailed as tax legislation, and with special provisions for various favored causes. The devil is in the detail, and a specialist agency such as the FCC, with its independent status, would be best in a position to deal with the details.

V. A NUMERICAL EXAMPLE FOR NET-TRANS ACCOUNTS

Let us look at an arbitrary numerical example of NetTrans. See also Table I. Assume:

1. An LEC with two customers service, which cost 30 each to provide, and whose price is regulated at A=10; B=40. Cost of providing access to an interconnecting carrier is 5.

Table I

Carrier/ Customer	Current Price	Cost	Cost Paid to Other Carriers	Net Revenue	Entitled Prices	Subsidy Required	NetTrans Debit	Entitled Price + NetTrans	Voucher	New Price
LEC A	10	30	0	10	10	20	2.5	12.5	25	37.5
B	40	30	0	40	30	0	7.5	37.5	0	37.5
IXC	15	5	0	15	5	0	1.25	6.25	0	6.25
IXC C	20	20	15	5	5	0	1.25	6.25	0	6.25
CAP D	30	30	0	30	30	0	7.5	37.5	0	37.5
Total	**115**	**115**	**15**	**100**	**80**	**20**	**20**	**100**	**25**	**125**

25% NetTrans

2. A competitive IXC interconnecting into an LEC, with an operating cost of 5 per customer, a regulated access charge to the LEC of 15.

3. A rival local CAP, also with a cost of 30, and a freely set price of 30 for its customer D.[5]

Under the Present System:

Customer A is being subsidized at a price that is 20 below cost. The revenue comes from two sources: (a) customer B, who pays 10 above cost; and (b) long distance customer C, whose call generates an access contribution of price minus actual cost of 15 - 5 = 10.

In such a system:

A. The CAP will have an over-incentive to serve customer B. It will be prevented from offering that service to B, or else the contribution by B to A would be lost. B thus has no choice among local carriers.

B. CAP will try not to serve customer A, who thus has no choice among local carriers.

C. IXC has an incentive to link up with CAP rather than LEC. It will be prevented from doing so to maintain the subsidy from C to A. (If it is permitted to bypass LEC, to maintain the subsidy to A, the rates on B would have to increase from 40 to 50, thereby increasing the pressures on B to try to switch to CAP.)

D. Customers C and B call less than otherwise, because their rates are above cost.

E. Customer A calls more than otherwise since his calls are below cost.

F. LEC has no incentive to reduce cost of operations.

Under NetTrans:

Local competition is instituted. Assume that the price for subsidized customer A remains at 10, plus the NetTrans charge.[6] The universal service shortfall for serving A is 30 - 10 = 20. Total net transmission revenues are given in column 5 of Table I.

To yield the required 20 to support A's universal service out of the aggregate net revenues of the entire telecommunications system of 100 requires these revenues to be charged at a NetTrans debit rate of 25%. (The formula for the debit percentage can be calculated as % = S/(R-S), where S is the desired pre-NetTrans subsidy, and R is the total of net revenues (If we maintain A's price at 10, i.e., without NetTrans charge, the equation becomes %=S/R-C. In this case, it would be 28.57146%.). There would be debits on the various carriers net revenues, given in column 8 in Table I.

1. Scrapping the Old System

Let us assume for the moment that the previous subsidy schedules are abolished, and competition is free. What happens?

A. Customer A gets a voucher enabling him to get service at the previous rate of 10, plus NetTrans.

B. With the contribution in the access charge to LEC abolished, access charges would be at 5, plus NetTrans charge. Also, because of competition in the long-distance market, and since all other IXCs would have the same reduced access charge costs, the IXC cost to serve customer C would drop to 12.5 (comprised of IXC's operating cost of 5, plus its access charge payment (now at 5), plus the universal service contribution of 1.25 on its net revenue).

C. LEC lowers its contributory price to customer B, since it now faces competition for that customer from CAP. The price would drop to 30, plus NetTrans of 7.5, i.e. to 37.5.

D. LEC can charge A the market price, i.e. 37.5, against which A can use their voucher of 25.

E. CAP now contests customers A and B. Its price would be 30 plus NetTrans of 7 for 37.5.

What are the implications?

A. Customer A is paying the LEC almost the same as before. (The increase is the NetTrans amount. As mentioned, we could also assume that this

amount is subsidized, and recalculate the amounts.) However, since he receives a subsidy of 25 directly, such as by voucher (or the carrier of his choice would receive it), he has a choice among carriers.

B. CAP can now reach A and B as potential customers. (B, due to the opening of the market and A, due to the NetTrans system which gives a choice also to subsidized customers.) If CAP's cost would be 29 instead of LEC's 30, it would gain both customers. CAP and LEC would, in effect, compete for A's subsidy voucher, by lowering their price.

C. IXC can use both LEC and CAP for access to customers. It pays either of them only cost based access charges.

D. IXC customer C contributes to universal service only its pro-rata share, whereas before it paid above average.

E. LEC customer B contributes to universal service only its pro-rata share, whereas before it paid above average.

F. CAP customer D contributes to universal service its pro-rata share, whereas before it was below average.

G. LEC would have major incentives to reduce its cost. First, because it could keep the cost savings. Second, because if it does no reduce costs, it will lose its customers to CAP. Third, because a built in productivity improvement factor will reduce in Period 2, the allowable cost to A and B could be set for Period 2 at 28 instead of 30, and LEC would be credited 2 less for each universal service customer served. And fourth, in Period 2 the calculation or required universal service support would not be based on LEC's cost, but on the lower of LEC and LT, in competitive markets. Hence, if CAP's costs have declined to 27, this would be the basis for the new calculation.

This translates, in the case in which all other universal service contributions outside of the voucher system are dropped, into a very simple system of raising revenues.

A. Each carrier owes on its transmission revenue, minus transmission payments made to other carriers, a NetTrans charge.

B. Intercarrier charges are also assessed as a NetTrans charge.

C. The NetTrans revenues are returned to customers as vouchers, or to the carrier of their choice as credits.

2. Keeping the Old System

It is likely that not all previous contribution elements would be abolished. The NetTrans accounting would accommodate elements of the old system. If access charges, for example, would not be reduced, NetTrans could simply adjust for it. The contribution would be credited to IXC's account against its debit and LEC, on the other hand, would have to add the access revenue to the calculation of its debit.

The reader may recall that among the criteria for a new system of financing was "transitional neutrality," i.e., that no customer class or carrier type should reap a windfall or be subjected to a shock. If the numbers indicate that this would happen, one may have to redesign the system. For example, if the IXC's contribution were to seriously decline under the new system, such changes may have to be offset by a charge based on call volume.

V. CONCLUSION

Why fix the old system? The answer is that the old system is a patchwork that barely holds together, and that it is a stumbling block in the transition to a competitive telecommunications environment. Competition and technology will not solve the universal service issue, because the policy question is not one of production efficiency but one of distributional allocation. Sooner or later we will have to face the problem. The underlying forces will not go away; they bring us many benefits, but they also force us to pursue traditional policy goals, such as universal service, in new ways. This is the challenge.

NOTES

1. This is a product of the subcommittee on Universal Service Methodology and Application set up at the August, 1993 Eight Annual Aspen Institute Conference on Telecommunications Policy. Eli M. Noam of Columbia University introduced the idea of *NetTrans Accounts* at the conference, provided a draft, and worked with the working group to produce this document.
2. For a more detailed version, see Eli M. Noam, *NetTrans Accounts: Reforming the Financial Support System for Universal Service in Telecommunications*, Columbia Institute for Tele-Information, Working Paper #648.
3. See also Gail Garfield Schwartz, "Universal Service Assurance Via Equal Access to the Subsidies." Thinking points by the Teleport Communications Group. September 21, 1993.
4. We assume in this example, for numerical simplicity, that no CAP access charges exists. There is no problem in dropping that assumption. Similarly, the assumption that cost to serve customers A, B, and D, is in each case 30 is made for computational simplicity and transparency. There is no problem in assuming that costs are different from each other.
5. We assume here that the NetTrans assessment on A's payment would be passed on to A. However, there is no problem in absorbing this charge and supporting it also. It makes the calculation a bit more complicated. The "benefitted service" of A would still be subject to a NetTrans debit, but it would not be paid by A, even on the portion he is paying. LEC would both be debited for the NetTrans and credited for it, so it would be a wash. One could therefore leave it out entirely from the NetTrans system. But in so doing, one creates unnecessary accounting and administrative problems, since the LEC (and ALT) would have to segment their revenues between different customer classes.