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REMARKS SUGGESTED FOR U.S. SECRETARY OF TRANSPORTATION WILLIAM T. COLEMAN, JR.
TO THE RESEARCH AND DEVELOPMENT WORKSHOP NATIONAL ACADEMY OF SCIENCES,
WASHINGTON, D.C., MAY 5, 1975

I noted with interest the title of Dr. Stever's opening address this morning, and regret that prior commitments prevented me from hearing first hand his presentation.

I hope that in my remarks I will not duplicate Dr. Stever's observations relative to "Transportation Research: The Road Ahead." Although, if I should repeat, I would take that as an indication that our policies with respect to research and development at the Department of Transportation coincide with the thinking of the President's Science Advisor. That, from my point of view, would not be bad.

The title I have given my own remarks - "Transportation Tomorrow: Research to the Rescue" - may sound a bit dramatic.

But then, transportation -- like so many other things in our lives we tend to take pretty much for granted -- is dramatic.

It is the linchpin stitching which holds together the fabric of America. Without it, this country would -- quite literally -- stop running.

In such simplicity, there is always drama.

There is no disputing the need for deeper research in the realms of transportation, and for the artful development of transportation technologies, efficiencies and economies.

I do not believe for a moment that we have exhausted our talent for innovation in this country, or that the final frontiers of transportation progress have been crossed.

We need to keep the pilot light burning in the laboratories of technological possibilities, just as we need to improve and refine the technologies in use. I'm not sure at this point how much of future Department budgets should be applied to long-range prospects, and how much to those research projects promising short-term benefits. I shall occupy myself with that question in the days ahead, and I will welcome your advice and recommendations.

I do sense that the slowing of the economy and industry's overhanging debt tend to slow technical advances. I am concerned by this, and by the general decline in recent years in the United States both in R&D spending and in the level of capital investments as percentages of the GNP.

Our physical plant is aging, productivity is declining. We have lost in recent years some of the technological vitality that has been one of the great strengths of our country. I believe Federal policies must seek to restore that vigor and replenish productivity. We will move in that direction through better incentives for research and development activities by private enterprise, by universities, and by government agencies in partnership with industry and educational institutions.

When President Ford asked me to come to Washington, and I agreed to undertake this job, it was with three purposes in mind:

One: To restore the railroads to the financial, organizational, and physical dignity needed for the tasks ahead;

Two: To recalibrate the Nation's transportation system, with emphasis on fuel efficiencies, environmental harmony, and safe, convenient service to the public at reasonable costs.

Three: To compress the time required to bring about the reforms, mergers, and regulatory changes modern times demand.

I accepted the invitation to join you here today because I recognize how important research and development policies and programs can be in the attainment of these goals.

In fact, if I were to add a fourth plank to my platform of purposes, it would be to accelerate the payoff of research and development activities.

I have no illusions that all of these objectives can be fulfilled during my tenure at the Department of Transportation. But I hope at least to apply sufficient momentum to cause visible progress in each of these areas.

There is, I think, a passage in James Cozzens' The Just And The Unjust which says it well. It's a conversation between the judge--Judge Coates-- and Abner, a new employee.

Abner asks: "What do you want of Me?" And the judge turns to him and says: "We just want you to do the impossible."

As I tell the President, I often feel like Abner.

We could easily be discouraged. Like it or not, we must concede a notable lack of spectacular success thus far in applying the aerospace brand of research and development to transportation problems.

The glamour systems for rail and transit travel have not materialized. But I suspect the fault lies not so much with our technologies as with our tactics. We have found that we can't "get across town" as simply as we can "get to the moon" because we have not taken sufficiently into account the social, economic, and political complexities of surface transportation. No prior travel habits had to be changed for the trip to the moon, nor were such things as fares, schedules, which street to use, and operating costs decision factors.

Now, please don't go away from here and report Bill Coleman as saying that next to his job, going to the moon was a snap. The Apollo project has been used as a standard of comparison for every social or technical ambition we have entertained, and the fallacies in the analogy are now well understood.

I do not discount the value of long range, even high risk research and development. As I mentioned earlier, it has served us well in the past, and -- I am confident -- will do so in the future. The necessity, for example, to become self-sufficient in energy almost certainly will require persistent research into new forms of energy, alternative sources of fuel, and new means of propulsion. One of the compelling problems President Ford has addressed in his energy program is the difficulty the civil sector encounters in finding the money for research and development -- even in potentially high pay-off areas.

When funding for research and development must compete with funding for capital investment -- which in periods of economic uncertainties must in turn compete with day-to-day operating needs -- it's the research and development requirements that generally get put on the shelf. It's been estimated that we will need, in this country, up to a trillion dollars in capital investment, in the next decade alone, to meet our energy needs. In the transportation area, extremely large sums will be needed for urban transportation and for rebuilding the railroads. With capital investment requirements of the magnitude now before us, funding "blue sky" research and development programs will be an increasingly difficult challenge for both government and industry. Yet by failing to do so, we will almost certainly weaken our competitive position among the industrialized nations.

So while long-term research and development prospects cannot be ignored, neither can our short-term needs. For very compelling reasons most of our transportation R&D funding - about 77 percent this fiscal year - is invested in programs expected to pay dividends in the next five years. About 17 percent of our R&D budget finances programs where benefits are anticipated in five to 10 years. And only six percent looks beyond 1985.

Whether this is the proper division, or where adjustment could or should be made, I'm not sure right now; but, as I suggested earlier, it's a matter I hope we can resolve together as we learn more precisely what our research efforts can produce.

Since so many of our transportation needs grow out of "here and now" problems, we need "here and now" research. Our current Department-wide R&D program is concentrated in six functional, not modal, areas.

First; we put a major emphasis on improving safety.

Like it or not, transportation is an accident-prone activity. The interlacing movements of many vehicles, some of them traveling at high speeds and operated by beings of varying skills and all too subject to human error, make accident-prevention constantly challenging. All in all, I think the transportation safety record is amazingly good - due in large part to intense efforts through the years by our scientists, engineers and technicians.

Transportation is a heavy consumer of "user-oriented" R&D. Our Coast Guard, civil aviation, and highway vehicle needs continually tax the state-of-the-art in safety technologies and eagerly scan the horizons of new developments.

Just last Wednesday I directed the Federal Aviation Administration to implement 19 recommendations made by a special Task Force organized earlier this year to probe the prospects for increased safety in commercial operations. One of these recommendations - and an extremely important one, in my judgment - calls for greater research by the FAA into the cause and cure of aviation accidents.

Similarly, we need further research in marine safety, to guard against collisions in busy harbor and shore operations; and - as oil exploration and deepwater port projects increase - to prevent spills and reduce the hazards that cause them.

Second; we are putting research and development dollars to good use in the improvement of transportation capacity and service.

Since this is the area of greatest immediate need, logically we are devoting the largest portion of our R&D budget to problems that range from urban traffic congestion to ways to reduce railroad track failure by providing a more durable rail or improving track geometry.

Two new transportation projects - the transbus and the state-of-the-art car - are now in the demonstration phase. But our capacity and service research actually focuses less on the "vehicle" - which industry is well equipped to develop - and more on the ways in which those vehicles can operate most effectively. How, for example, can high-capacity buses or advanced-design rapid rail cars serve a community with maximum efficiency at moderate cost? Only by merging "technical research" with "social research" can we be sure of producing products people will use. Our programs of university research, I might note, have been very instrumental in serving that purpose.

Third; much of our effort is being directed toward cost reduction.

If I could challenge the scientific and technical community to maximum effort in any one area of transportation research, it would be in efforts to reduce construction, installation, maintenance, operating and vehicle costs. Success in cost reduction obviously assists our ability to succeed in other areas.

I am concerned, for example, that while 85 percent of the Interstate System is now open to traffic, representing a national investment in excess of \$50 billion, 39 percent of the estimated costs of the total system still is needed to construct the remaining 15 percent and complete work on the portions already in use.

I am concerned, for example, by highway construction costs of \$100 million a miles - or even higher - associated with some projects.

I am concerned, too, by rising subway construction costs, not only here in Washington but elsewhere; and by airport, railroad and intermodal development costs that make rational repayment propositions difficult to conceive.

In short, I am concerned - greatly concerned - over our ability to remake transportation in the shape today's energy and environmental sensitivities require unless we find more effective ways to cut, curtail and control costs. I ask your earnest support in this endeavor.

In this connection, I might note in passing that developmental efforts in this area can pay off in helping us overcome a dilemma in another area. As one example, highway proponents and environmental protagonists in Memphis have been locked for years in a controversy over the alignment of Interstate 40 through the downtown part of the city. We were able to resolve this issue recently by limiting the proposed "cut and cover" construction at the city's Overton Park to a width of only 80 feet. That alternative had been made possible by a new subterranean construction process involving slurry wall tunnel technology.

I should, perhaps, keep my fingers crossed on that point. I have asked my Assistant Secretary for Systems Development and Technology, Bill Stoney, and his people for a feasibility study on that mode of construction. I'm trusting, of course, that they won't let me down.

In any case, we intend to continue our pursuit of new tunneling technologies. Our goal is to reduce costs by 30 percent and increase the pace of construction by 100 to 200 percent, and - to the fullest extent possible - compress the environmental impact of tunnel work.

Then, fourth; research can be valuable in unlocking new ways to conserve energy and protect the environment.

We are spending only about 9 percent of our research funds in these areas this year. But funding, I am confident, will rise in proportion to the yield and in keeping with national priorities.

The 40 percent improvement in fuel efficiency we are asking from the motor car manufacturers should, in my opinion, be a starting point - and in any event - a minimum, not a maximum requirement. If a mean fleet average of nearly 20 miles per gallon is possible through some tinkering with today's technologies, then I am hopeful that vastly greater gains ultimately can be achieved through diligent research.

I realize, in saying this, that technical progress cannot be legislated or wishfully induced. But in noting the rising share of the domestic automobile market being captured by foreign makes, I suspect that the economic influences being exerted may be sufficient to move motor car fuel economies in the direction they should go.

Fifthly; research and development provides us future options. They open new vistas; take us where no one else has been; build the knowledge base on which new and better systems will be structured.

We include in this category two types of research, development and demonstration work:

- One - The high-risk but potentially high-payoff development projects. These include the air-cushion, magnetic levitation, and linear induction rail technologies the Department has been exploring, with industry, for a number of years. It includes an aeronautical satellite system, an advanced air traffic management system, our people-mover programs and a dual-mode transit system. These are costly ventures - for the most part beyond the means of the private sector alone. While the potential benefits make such projects continually tempting, we may have to narrow the focus on the cost-benefit ratio before committing future resources to generally high-risk undertakings.

Two - The second category of R&D funding aimed at cultivating future options is well exemplified by our University Research Program. That program is well known to everyone here and I won't take your time today to go into the results already produced or the projects underway. We are asking for an increase in the university research and training budget - to \$27.5 million - for fiscal 1976.

From what I have been told of this program, and from what I have seen of the projects, I believe university research serves us well in three ways:

One - It relates hardware developments to the social and economic environment in which those entities must operate, producing a "system" for market as well as technical analysis.

Two - By expanding the available knowledge on any system or proposal, it gives us the opportunity to make decisions faster and with greater assurances that those decisions are right. And if we are going to accelerate the research and development cycle and get new products into the transportation mainstream more rapidly, decision time must be shortened.

Then, three - university research attracts and trains the new talents needed to transform transportation in response to today's priorities and tomorrow's needs. Surely we can use more bright young people, at the Federal level but in state and local transportation planning and implementing positions, too; and in industry. I am told that apprenticeship in transportation research work at the graduate level virtually assures the student of a job after graduation.

I have talked longer than I intended. Let me conclude quickly by making a few summary observations.

First; I believe the payoff from our research and development policies will improve each year, based on what we are doing now. The lessons learned in recent years have taught the risks of over-optimism in launching and conducting development projects; and the hazards of studying transportation vehicles in isolation to the social environment in which it will function.

Second, research alone will not rescue our transportation capabilities from the quagmire of inefficiencies that now constrain performance and add to costs; but without well-placed, properly-funded research and development programs, our total efforts will be handicapped and our prospects for success diminished. Frankly, I would hate to tackle the road, rail, air and transit problems currently awaiting solution without the promise of research and development resources as allies.

Then, third and finally; we need major improvements in transportation if we are to reverse the decline in productivity, which fell three percent in 1974 - the first actual drop in U.S. productivity since 1947.

Advances in productivity - improvement in the ratio of output to input - have accounted for half of the economic growth of the United States over the past century. For the last 50 years, our ability to increase productivity - in effect, to do more with less - has accounted for virtually all of our progressively higher living standards and gains in real income.

While the slowdown in the economy is to blame to some extent for this situation, the fact remains that productivity growth has been accelerating in other countries in recent years while it has been declining here. Moreover, since historically most of the growth of productivity in the United States has resulted from technological improvements, the present decline in productivity must reflect the relative decline in the overall rate of U.S. technological progress. Although I do not find this state of affairs alarming - the United States is still the strongest nation technologically even though we may not dominate the field as we once did; but while I am not alarmed, I am concerned. The situation bears watching, along with a deliberate commitment on our part to re-assert the scientific and technical vitality of this country by exercising anew our "Yankee ingenuity" in response to challenges of vast proportions.

Transportation offers such challenges - in abundance. And you, and I - representing the academic community and government - along with industry, possess the means to cope with those challenges.

Let's all get on with the job.

It is not impossible -- if we make the effort together.

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