U. S. DEPARTMENT OF TRANSPORTATION
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20590

STATEMENT OF JAMES M. BEGGS, UNDER SECRETARY, DEPARTMENT OF TRANSPORTATION, BEFORE THE SENATE COMMITTEE ON AERONAUTICAL AND SPACE SCIENCES, WEDNESDAY, MARCH 4, 1970.

Mr. Chairman and members of the Committee:

I appreciate this opportunity to appear before you today to discuss the activities of the Department of Transportation in the field of aeronautical research and development, the relationship of these activities to work performed by the National Aeronautics and Space Administration, and the role of both of these organizations in meeting the present and future problems in civil aviation.

The Department of Transportation is charged with overall responsibility for developing and improving a coordinated transportation system and for stimulating technological advances in transportation. In the aviation area the Department of Transportation is responsible for establishing standards of safety and dependability concerning the design and operation of aircraft, developing and operating the airways system, administering the Federal-Aid Airport Program, and improving the neighborliness of the total civil aviation system. In each of these tasks, we rely on NASA to help meet the demands placed on us, particularly in helping to provide a flow of new technology in order to anticipate and solve our system problems.

We rely on NASA to carry out the invaluable functions of exploring the "possible" in the various disciplines such as aerodynamics, avionics,

propulsion and structures, so that there can be follow-on development of the "applicable" by NASA, FAA, or private industry.

We see the role of DOT as that of establishing objectives and providing guidance through the formulation and evaluation of new systems concepts so that research effort can be applied in areas where it is most needed. In order to insure the most efficient use of resources, a close working relationship must be maintained between DOT and NASA.

The kind of support that we obtain from NASA can be generally described in three categories: first, the specific technological information contained in reports and papers; second, the availability of resources, both personnel and facilities, by which NASA can perform development and test projects at our request; and third, the technical expertise of individuals who are available for advice and consultation as we require.

The support given by NASA in the areas of flight technology includes STOL aircraft high-lift devices; new methods of obtaining controllability; better displays in the cockpit; supersonic aerodynamic and thermal fatigue analyses; reliable structural fatigue analyses for rotorcraft; V/STOL maneuvering requirements in the transition speeds; and direct-lift control. Continued NASA work on development of more resilient, lightweight, corrosion resistant materials and new fabrication processes will contribute a greater measure of safety, dependability and economy in all civil aircraft.

In the second category of testing and use of facilities in direct support of DOT requests, NASA has supported the tracked air cushion vehicle program of our Office of High Speed Ground Transportation. This support has included the testing of the vehicle shape in simulated operations with a moving ground plane, technical advice on the dynamics of the system related to ride quality, and assistance in the development of RFP's for proposals and in the evaluation of the responses. As a part of our Metroliner project, specialists in NASA have assisted us in analyzing the suspension dynamics of the vehicles. The FAA has requested NASA to carry out simulation programs for the supersonic transport, V/STOL concepts, and various CTOL operations. They have also requested NASA to study elevated STOLports and the problems associated with wake turbulence at airports.

In the third category of consultation and expertise, we have had for some time agreements with NASA regarding the coordination of R&D programs and technical support for our programs. Coordination on an informal basis between representatives of the two agencies has always been prevalent. This year, for the first time, a working arrangement was achieved between DOT and NASA for reviewing each other's preliminary budget requests as they pertain to aeronautical R&D. A primary objective of this action is to assure that programs in civil aviation are complementary and responsive to jointly identified needs.

In addition to this type of annual coordination, there is frequent cooperation between NASA and DOT on other activities, such as the NASA/FAA Coordinating Committee for R&D programs and the assistance of NASA to the

National Transportation Safety Board's Bureau of Aviation Safety. The DOT Air Traffic Control Advisory Committee activity of the past year was a primary example of specific consultation provided by NASA at our request.

We look forward to continued cooperation with NASA in our future relationships. We are conscious more than ever of the need to preserve those resources on which we have drawn over the years. Moreover, we feel that it is incumbent upon both agencies to optimize the effective application of these resources.

Our principal effort in this area centers around the conduct of the DOT/NASA joint study on civil aviation R&D policy, which your Committee was the first to recommend. DOT has the responsibility for coordinating this effort. We have personnel from DOT, NASA, DOD and CAB participating in the study, as well as several outside consultants.

We have prepared a paper which discusses at some length the structure, the organization, and the functions that are being addressed by this joint study. I will be pleased to submit this for the record if you so desire.

Our original plan called for three months to organize and staff the study. However, it has taken us almost twice that long to accomplish this phase. Nevertheless, we are now ready to present the total study plan for review at a meeting of the Study Advisory Committee scheduled for March 10th. Assuming that this plan is approved at that time, we will then be able to provide you additional detailed information for the record.

So as to put the study in the proper total context, let me briefly summarize our approach as it has been developed in response to the specific recommendations of your Committee. The stated objective is to identify

the benefits that will accrue to the nation from civil aeronautical research and development and relate those benefits to the level of effort required to achieve them. Following this an assessment will be made concerning the appropriate distribution of effort between government and industry and within the government itself.

This is a difficult and complex task. There is no instant clarity as to what can be identified as beneficial. Furthermore, benefits may be difficult to identify even in terms of their degree of negativeness or positiveness.

The approach that has been selected is to accept the identification of goals and objectives as stated by the Executive Branch, to evaluate their impact as they relate to the various types of air transportation, to define in conceptual form the systems that could provide that type of transportation, to evaluate the performance and effectiveness of these systems against other modes of transportation, and to further evaluate these systems as to their profitability. When a successful or effective functional system has thus been identified, it can be broken into its primary elements: air vehicles, airways and airports. I want to emphasize that "airports" in this case include the total airport complex; i.e., multiple landing fields in a given community, as well as the problem of airport access and egress. Finally, the study will consider cargo to be in two categories -- people and goods.

With the system thus defined in general terms and with certain performance characteristics implied, benefits that would accrue to a particular area from the use of such a system can be postulated and assessed. The objective will be to maximize the benefits to all people in

the area, not just the 15 or 20 percent of the total population that currently use air transportation. Such benefits could be in terms of improved land utilization, reduction of congestion and the corresponding reduction in air and water pollution, as well as the more direct benefits in savings of time in the shipment of goods and people.

On the technological side, the same system elements can be analyzed as to their ability to operate in conjunction with one another, and they can be assessed in terms of the critical technologies required to accomplish their particular performance objectives. Estimates can then be made of the development cost and time required to achieve these objectives. Finally, these costs can be compared to the benefits that would accrue from operation of the system.

It is almost assured that there will be certain characteristics of systems whose benefits are not capable of being quantified. Rather than set aside such a system option, we will suggest demonstration programs that will test the ability of this particular technology to provide a desirable and beneficial service. In this case, the question to be resolved is: "How do we implement and fund such test and evaluation programs?"

We believe we understand the significance and the difficulties associated with this study. We are committed to provide substantial analytical information by the end of September to support our planning for FY-72 and beyond. However, it is clear that some elements of this process will not be completed by the end of this calendar year. We now expect that it will be necessary to extend the work by as much as six or eight months into CY-71.

We feel that this is an important and justifiable effort and we anticipate that the results of the joint study should prove of great value in establishing, much more precisely than in the past, what role the government should play in aeronautical R&D and where the emphasis should be placed.

Mr. Chairman, that concludes my prepared statement. Now I will be happy to answer any questions you may have.

DEPARTMENT OF TRANSPORTATION | NEWS

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REMARKS PREPARED FOR JAMES M. BEGGS,
UNDER SECRETARY OF TRANSPORTATION,
AT WESTERN GOVERNORS' CONFERENCE ON
"THE APPLICATION OF SCIENCE AND TECHNOLOGY
TO THE PROBLEMS OF POLLUTION, TRANSPORTATION,
AND EMPLOYMENT", MARCH 11, 1970, SALT LAKE CITY, UTAH

Gentlemen, I am honored to represent Secretary Volpe here today to join you in this timely discussion of the application of science and technology to our pressing domestic problems.

We are, I think, in the early stages of a new "age" in the United States. We are entering into an era of a merging of various philosophies, often conflicting, but generally drawing together with the common purpose of finding solutions to the challenge of finding a better total quality of life for all individuals. We have left the "Age of technology", where a technical innovation, in and of itself, was sufficient cause for the formation of a great new industry or the initiation of a large complex project. We seem to be shifting now to a period of more complexity in decision-making, where the

longer term effects of our technological advances may be the true determinant of the decision to proceed or not to proceed. To coin a phrase, this might be called the "Technosocial Age."

For this reason, I am glad to see this Conference reassessing the role of science and technology in today's society. The slide rule and computer will continue to be fine tools, but the additional dimensions of social and political realities are becoming more and more crucial in finding a way to make progress toward a better quality of life for us all.

This is not to say, however, that technology should take a back seat in social progress. I disagree completely with those who would sacrifice our technological thrust to the solution of so-called social problems. In my view, we need to move forward on both fronts. If we do not continue to advance technology, if we do not maintain our thrust in science, we will simply, as a nation and as a society, move backwards. Clearly, we cannot solve the problems of our cities if, at the same time, we are losing ground in our technological competition with the rest of the world.

I would also point out that solving these "social" problems is not merely a matter of applying massive resources. Many people say that the success of the space program and the success of some of the other technical programs we have conducted in recent years was due merely to the large application of resources. They further extend that argument to say that if we allocate the same amount of resources to our other problems, we can achieve the miracles that will be necessary to solve them quickly. This is, of course, a very simplistic view of the situation.

As a matter of fact, I think you could argue that on the Federal level we tend to spend more money on our unsuccessful programs than we do on our successful ones. I'm sure that you can name a number of programs that have been going on for a long, long time which have been relatively unsuccessful in coping with the problems at which they were directed. I cite the Welfare program as a prime example. However, it is certainly true that the proper application of the right amount of resources can do wonderful things in our economy if we bring to bear a total team consisting of government, industry, universities, and private citizens.

With this as introduction, let me address specifically the subject of transportation and its relationship with science and technology.

First, I think there are several rather obvious objectives that we all would like to set for our national transportation system.

We would like to have a balanced system, in terms of availability of alternate modes, and a minimum of disruption at the modal interfaces.

We would like to have all forms of transportation compete on an equal basis, allowing the forces of supply and demand to arbitrate the modal splits.

We would like to have the government take a leadership role in encouraging high quality performance equally across the system, preferably with a minimum of intervention. Where government support is required in the public interest, it should be applied on an impartial basis.

We would like to insure that the transportation system improves the total quality of life, rather than causing a blight on certain localities, usually located on "the other side of the tracks."

And finally, we would like to make it a 100% safe system, eliminate human error, and provide services at a reasonable cost.

These then, are our ultimate objectives for the "perfect" transportation system. This is what we would like to have. But the real life factors of economics and politics have prevented us from meeting these goals. Ever since Colonial times, transportation has developed as the result of scattered efforts of public and private groups, with little long range, coordinated planning.

In reality, today we have a very unbalanced transportation network -- not system. And in a way, technology, or the lack thereof, has contributed to this imbalance. We have applied technology rapidly to the fields of aviation and automobiles/highways. The very success that this technology has produced has added to the economic and political pressures to increase and accelerate activity in these modes. This has in turn caused a sort of social

strata to be formed around these modes, so that people tend to prefer them as a means of travel over the less successful modes, such as railroads and mass transit. I might add that even the word "mass" carries with it a sort of stigma.

There is a kind of snow-balling phenomenon engendered which causes government action, financing availability, and public support to become unequal among competing modes and thus increases the disparity among them. Transit riders decrease at an alarming rate, and our highway system reaches capacity almost before we can obligate another huge sum for expansion.

Meanwhile, there is little incentive for the successful modes (and their government counterparts) to work out inter-modal interface problems. The discontinuities at the junctions become greater and we find that while we can fly freight across the country in five hours or less, it takes up to five days to get it from the terminal to its final destination.

And finally, success breeds some degree of arrogance. The result is a negative impact on the environment and people's lives. We sometimes bulldoze freeways through homes and parks. We kill off our citizenry at the rate of more than 1,000 a week in highway fatalities.

Many would put the blame for this situation squarely on the shoulders of technology. But this is a false accusation that could lead to a harmful over-reaction against technology. We must not bow to those who are anti-technology, but rather we must show them how technology can be responsive to human needs. Fortune magazine recently produced a special edition on the environment. I would like to quote from Fortune's editorial on the subject, which I believe represents an appropriate national stance toward technology:

> "We know that isolated societies with very low levels of technology do not greatly damage their natural environment. We also know that our high-technology society is handling our environment in a way that will be lethal for us. What we don't know -- and had better make haste to test -- is whether a high-technology society can achieve a safe, durable and improving relationship with its environment. This -- and not a return to the pre-technological womb -- is the only possibility worth investigating."

So, we come to the real crux of the problem: How can we best apply and control technology? This is basically a leadership problem, and the responsibility for providing this leadership must rest squarely with state and Federal governments. Note, I said leadership, not necessarily implementation.

Peter Drucker, in his recent book, The Age of Discontinuity, suggests that the government should substitute a principle of performance rather than authority in its dealings with the private sector. Government would become increasingly the decision-maker -- the orchestra "conductor" that tries to think through what each instrument is best designed to do.

The Federal role should be one of matching resources to needs and of setting priorities. Program decisions should be made at the local level where the needs exist. Governors can serve as channels for the decisions of mayors and other local officials.

The role of the Department of Transportation is that of a catalyst. And this is the precise purpose for which the Department was created.

Perhaps we can best describe that function by taking stock of our present transport system, and determining what needs to be done and the priorities that must be set.

Our nation's highway system is perhaps one of the best success stories ever told. The Interstate System, now nearly 70% complete, is the part of this total system which gets the most publicity.

It represents the greatest public works program in the U. S. history. It is also the safest highway system in the world, with a fatality rate less than one-half that of other highways.

Of the system's total authorized 42,500 miles, almost 30,000 miles are now completed. That portion of the remaining 30 percent, which is in our urban areas, will be slower and more difficult to build. For it is in this very small portion of the total system that the major problems of urban congestion and local environmental and social issues become prominent. Therefore, we have identified the solution of the urban traffic congestion problem as one of our top priorities.

We now have 100 million registered vehicles in the U.S. We are adding 10,000 new cars per day to that population, mainly in the cities. And with each new car the mobility factor decreases due to congestion. The average auto speed in New York today is 13 miles per hour. Most city cars sit at idling speeds one-third of the time.

Moreover, land is at a premium, making the construction of even more highways questionable. So we are turning more and more to technology -- technology that will increase the capacity of urban streets. In many instances, this can be achieved through automation.

Television commentators and magazine editors like to picture automation as a computer driven car carrying a coffee-drinking passenger at high speeds on narrow, downtown streets. And someday, perhaps, that picture may be accurate.

Most highway planners today, however, see traffic control improvements as more evolutionary than revolutionary. Steps are being taken, of course, to speed the evolutionary process wherever possible.

We have several related research projects in or near the demonstration stage that should significantly increase the capacity and safety of existing highways. These experiments fully utilize the potentials of electronics, data handling, and communications. They are still premised, however, on the driver remaining in control of the vehicle.

One of these is the Electronic Route Guidance System (ERGS). It is the equivalent of having a navigator at your side -- a navigator who knows the way.

If this system proves effective, it could be expanded to analyze traffic conditions on all routes in a travel corridor and guide the motorist in the best direction. Thus, we could equalize the traffic load on all available streets.

Several systems are being tested to control the merging maneuver on high-volume urban freeways. A passing aid system to alleviate the serious traffic flow problems on rural two-lane highways is also being tested.

New traffic control systems for cities, and electronic systems to aid motorists in distress, also are being advanced.

So when I speak of evolutionary progression, I mean: first, individual motorist aids; next, an integrated traffic aid system; gradually, automation of limited control functions; and finally, more extensive automated control.

The other major priority in the highway area is, of course, safety. Here we have identified three major program areas to receive attention at the Federal level. The first is the problem of alcohol and how to reduce fatalities due to drivers who drink. The second is the development of the air bag as a passive passenger restraint system. Thirdly, we are initiating the development of an experimental safety vehicle which will be capable of impacting at 50 miles per hour without harm to the vehicle occupants.

Through these and other safety related research and development activities, we hope to provide the industry and the states with the direction and technical data for their own initiatives in reducing our national highway death toll.

In the aviation industry, we find a sector of transport supported by burgeoning technology, effective salesmanship, and extremely rapid expansion of traffic demand. In 1964, there were 83 million air carrier passengers. This figure grew to nearly 153 million in 1968. The number of air carrier operations (take-off and landing) grew accordingly from 7.4 to 9.9 million. Including pleasure and business flying, public aircraft and air taxi operations -- general aviation has grown by leaps and bounds. Today, in fact, four-fifths of the total daily operations handled by FAA terminal facilities is comprised of general aviation.

In meeting the demands of society for rapid and comfortable transportation, the aircraft industry has provided a wide variety of aircraft with wide price and performance ranges. On the other hand, we have not provided the necessary ground facilities to adequately manage the operation of these aircraft. Our present air traffic control system, although the best in the world, cannot cope with the peak demands at certain locations and must be upgraded to meet the growth that we know will continue. We must also encourage and support development of new airports and take steps to increase the safety capacity of existing facilities.

The biggest problem in meeting these unfilled needs is not so much finding new technology, but rather the application of what we already know. Terminal congestion, for example, could be reduced by the addition of more runways and better ground facilities, including airport access. Air traffic control can be improved by the use of state of the art computers, radars, transponders, and navigation aids. The need is to design, test, build, and integrate an overall system for safely managing the ever increasing numbers of air operations.

The Department of Transportation has given high priority to the continued automation of the air traffic control system to increase system capacity while maintaining its fine safety record. Multi-million dollar contracts have been awarded for extending automation to more than 60 of the nation's busiest airports. In addition, contracts have been let to purchase more than 100 sets of full and partial landing systems for installation of the nation's smaller airports. Steps are being taken to implement area navigation systems utilizing existing ground equipment, but placing a higher demand on airborne computer technology to provide pilots with a greater choice of flight patterns.

Despite these efforts, congestion remains above critical levels at key airports serving New York, Chicago, and Washington. This necessitates the continuation of Federally placed limits on the number of hourly operations at these airports. Such restrictions will have to be continued until the new facilities can be brought into operation.

While improving the capacity of the system, we must also make civil aviation more "neighborly" with its environment. We will continue, through the FAA, to develop noise regulations for all types of aircraft, based on the best that technology can offer in the way of noise reduction design. The Departments of Health, Education, and Welfare and Transportation recently made an agreement with the airlines to retrofit almost 3,000 of their Pratt & Whitney jet engines to reduce smoke pollution to a minimum.

We will continue to place environmental considerations at the forefront in all of our decisions regarding airport construction and aircraft certification.

The Airport/Airways Expansion Act, just passed by both Houses of Congress and now in conference, will provide the necessary resources to launch a massive attack on all of these priority problems. This legislation will provide, for the first time, an adequate source of funding, through user charges, to upgrade our air traffic control system, expand and improve airports, and provide the needed research and development base for future system growth.

Let me turn now to rail transportation, where we have a situation of deterioration in the whole system. This situation requires the development of some new and innovative approaches. It leaves the door open for the development of a totally new form of surface transportation. Right now, that form appears to be tracked air cushion travel.

Several weeks ago, we unveiled a new rail research vehicle powered by a linear induction motor. It can travel at speeds up to 250 miles per hour, emits no noise or air pollution, and uses its propulsion system to brake itself.

It straddles, without touching, a thin vertical rail that is a key part of its electrical propulsion system. Electricity generated within the vehicle flows to two electromagnets, one on each side of the vehicle. A rapid fire series of magnetic tugs between these electromagnets and the metallic center rail propels the vehicle down the track.

In our Northeast Corridor project, where we have relatively fast trains running between Boston, New York, and Washington, several high-speed problems have emerged. Among them are the inadequacies of the roadbed, braking, noise, achieving really high speeds while maintaining contact with an external power source, and reliability.

We feel that the linear induction motor could solve many of these problems. It is, however, a totally new transport mode, and will require a good deal of research and development and demonstration prior to operational use.

We can see the need for more government involvement in rail passenger service, no matter what form the vehicle may finally take. High speed rail corridors in the dense urban sections of the nation will be needed to provide an alternative to more highways. Rail

safety must be improved by Federal standards and increased research on contributing causes of accidents. Hazardous materials shipments must be regulated and made safe from catastrophe accidents.

All in all, this mode of transportation warrants increasing government attention in order to stimulate the upgrading of its service to the public.

Finally, let me mention briefly our last top priority area -- that of urban public transportation. This is a mode which has changed little in the last 50 years, as far as technology is concerned. Accordingly, it has seen a serious decline in patronage and revenue, and a very high bankruptcy rate. Coupled with the fact that 80% of all Americans live in cities, and 25% of these don't drive automobiles, we can see the need for a massive increase in funds and effort to provide more attractive, efficient, and reliable public transit systems in both large and medium sized cities.

Our proposed Urban Transportation Assistance Act will provide such dedicated resources for renewal of this mode during this decade. It will be a start toward relieving our urban congestion, but it will probably take up to 20 years to make an impact on a national scale.

These, then, are the priorities as we see them today. They can be summarized generally as increasing system capacity, improving safety, recognizing environmental impact, and improving public service. Technology exists, for the most part, to solve these problems.

The Federal role is to stimulate the application of this technology, make decisions to allocate resources, and provide long-term planning for the total transportation system.

The state and local role is to make the actual program implementation decisions, based on local needs and pressures. An interface mechanism between Federal, state, and local agencies for the science and technology part of the process would certainly assist this action. This Conference is an excellent first step towards such an interface, and I congratulate you all for your fine work.

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STATEMENT OF JAMES M. BEGGS, UNDER SECRETARY, DEPARTMENT OF TRANSPORTATION, BEFORE THE SUBCOMMITTEE ON ANTITRUST AND MONOPOLY LEGISLATION, SENATE COMMITTEE ON THE JUDICIARY, REGARDING AUTOMOTIVE REPAIRS, TUESDAY, MARCH 17, 1970.

Mr. Chairman and members of the Committee:

I welcome this opportunity to discuss the automotive repair problem and the plans and programs of the Department of Transportation relating to it. Let me, at the outset, summarize this relationship.

As the Committee knows, the primary role of the Department of Transportation under the Motor Vehicle and Highway Safety Acts is to preserve and promote auto safety. This means that while the Department is concerned with auto repairability, it is within the context of safety. In that context, there are several ways in which we can act to ease the consumers' auto repair burden. For example, new vehicle safety standards which the manufacturers must meet can require incorporation of vehicle reliability, durability, diagnosis of malfunctions, and the quality of repairs. In contrast, used vehicle standards which relate to the condition of the vehicle in actual use on the highways are directed toward the consumer, who has the general responsibility of keeping his vehicle in safe working order. But clearly, before we issue used vehicle standards that the consumer must meet, he must be able to obtain at reasonable cost the parts and service necessary to meet the standards.

In the Chairman's letter to Secretary Volpe of January 29, 1970, several specific questions were posed. I would like to submit for the record a detailed response to each of those questions. In further elaboration of the issues involved, I would also like to offer for the record

(1) an updating of the Department's report to the Committee of July 16, 1969, and (2) an analysis of the first 2,000 complaint letters received by the Committee and referred to the Department.

The questions raised in the Chairman's letter center on two broad issues:

1. The Department's authority to improve new vehicle performance for improved repairability in later use; and
2. The Department's authority to regulate or influence the cost and quality of repairs of vehicles in use.

It is to these issues that I wish to direct my comments today.

Careful maintenance and properly performed repairs will keep vehicles in safe running order, thereby reducing the chance of an accident. However, it is possible to design vehicles from the start to lessen and possibly even avoid later repair burdens. Under the Motor Vehicle Safety Act, a number of new vehicle safety performance standards have been issued by the Department and others are under development which incorporate provisions for reliability of critical vehicle components, ease of diagnosing vehicle malfunctions, ease and accuracy of repairing safety critical parts, and reduction of vehicle structure fragility.

In the area of reliability, the tire safety standard requires high-speed durability and flex durability assurance before it is certified for sale by the manufacturer. In the lighting standard, there is a requirement for sealed beam headlamps to incorporate vibration and corrosion durability. This standard also requires turn flasher life cycle compliance over a wide range of temperatures, with a controlled flash rate. The brake hose

standard contains whip flexing, burst and tensile durability, and corrosion resistance requirements. In addition, the Department has proposed an amendment to the brake fluid standard which would require maintenance of a needed high boiling point under high moisture environmental conditions. A proposed amendment to the brake standard would significantly increase stopping ability both before and after severe energy absorption conditions and wet brake conditions. A proposed new standard would require the return to the idle position of a failed or stuck accelerator to prevent the vehicle from lurching forward in such an emergency.

With regard to ease of diagnosing vehicle malfunctions, the existing tire standard for passenger vehicles requires the incorporation of a tread wear indicator that warns the owner when an unsafe tread depth has been reached and the tire should be replaced. The brake standard requires a light to signal on the dash board to tell the driver that the hydraulic system has failed. In proposed form are two standards which would also alert the owner of failures. The proposed brake standard would require a dash board light to also indicate when the brake fluid has reached a specified low level at which point additional fluid should be added. The proposed amendment to the lighting standard would require a dash board indicator when a head lamp or tail lamp has failed.

In the area of ease repairability, the lighting standard presently contains dimension requirements for interchangeability of head lamps and small bulbs which simplifies replacement selection and inventories. At the proposal stage is a requirement for trailer hitches which would require

specific ball diameter and coupling socket dimensions to permit both interchangeability for proper matching and to prevent mismatching of larger trailers to smaller capacity hitches. The capability of modern engineering technology to design complex systems for quick and reliable repairs has been amply demonstrated in the space program and will be pursued to the extent possible in our motor vehicle standards.

We have been impressed by insurance industry and other witnesses who have testified that body shop repairs for low-speed collisions absorb a disproportionate amount of insurance premium dollars, and that in the past 10 years the cost of crash repairs has risen almost three times faster than the cost of maintenance repairs. The challenge is presented to the automobile industry to build a car that does not require a $400 repair bill when it is hit at speeds of 5 to 10 miles per hour. A more effective bumper, some distance in front of the car body, would prevent much of this low-speed collision damage. I cannot believe that the American buying public is so infatuated with style that it prefers a bumper practically flush with the sheet metal instead of out in front protecting it.

The Department is interested in bringing back the bumper for other reasons. In our priority goal of improved crashsurvivability, two major directions have been set: passive restraint systems and impact energy-managing structures. The first is represented by the "air bag" which is the subject of a rulemaking action started last June. Industry appears to be making very encouraging progress in development of practical air bag

systems which might be available in production models as early as 1971. The second direction is represented by a rulemaking action now in progress on bumper effectiveness. This will be the subject of a technical meeting on this coming April 2nd.

This and other bumper regulations will provide additional safety by preventing vehicle override and underride and damage of safety-related components during parking lot type impacts with fixed objects up to 5 miles per hour. As a by-product, however, it is anticipated that the standard will also eliminate or sharply reduce vehicle body damage in both front and rear vehicle-to-vehicle engagements for closing speeds up to about 7 miles per hour.

In addition to design for repairability, the manufacturer has another major impact upon later repair cost burdens of the car owner. This is production quality control -- or the care with which the vehicle is assembled on mass production lines, and inspected prior to delivery to the dealers and thence to the new car purchasers. Industry's record in this regard is not outstanding. Since the passage of the Motor Vehicle Safety Act:

- 12,946,406 vehicles produced by domestic manufacturers representing 38% of domestic production have been the subject of safety defect notifications.
- 1,227,004 vehicles produced by foreign manufacturers representing 37% of the imports were the subject of safety defect notifications.
- 527 separate recall campaigns have been initiated.

It is clear that industry must improve its production quality control. We believe that this is beginning to occur under the stimulus of companies seeking to avoid costly defect recall campaigns. One industrial executive has indicated to us that it costs his company more than $12 for each dealer man-hour of defect recall corrective repairs, compared to about $7 an hour if the job is done right in the first place at the factory.

The safety defect notification provision of the Motor Vehicle Safety Act thus has generated a substantial economic incentive for manufacturers to improve production quality control. Although it is difficult to estimate the magnitude of this effect, it certainly is in the right direction.

In summary, while the Department's regulatory authority cannot be used to influence the design solutions to all repair problems, we can and do consider repairability as a factor in issuing safety standards.

I would like to turn now to the second broad issue -- the Department's authority to regulate or influence the cost and quality of repairs of vehicles in use. While many of the repair problems the car owner faces can be traced to its original design, other factors are clearly involved. To mention a few: high costs of parts and repairs; inadequate or faulty repairs, including those with warranty coverage; incorrect diagnosis of vehicle malfunction; untrained or unskilled mechanics; inadequate repair facilities; and inadequate motor vehicle inspection programs.

But the bulk of the corrective actions suggested to deal with these factors, such as motor vehicle inspection and related diagnostic services, licensing of repair shops, and certification and training programs for

mechanics, can be implemented effectively only at State and local levels or by the industry itself. This is true regardless of the scope of the Federal role in the issuance of standards, or the provision of financial assistance and technical guidance.

Stated otherwise, solutions to the automotive repair problem will be found largely in efficient Federal, State, and industry programs aimed at:

- providing adequate assurance to the car owner as to the quality and cost of the repairs which he purchases;
- improving the quality, convenience, and cost of motor vehicle inspection directed toward assuring that only vehicles in safe working order are permitted on the public roads.

If these programs for providing car owners with assurance of adequate vehicle repairs must be State responsibilities, they will, if developed solely in the safety context, have to compete with other priority safety programs such as alcohol-driving controls and police traffic services. To become self-sustaining on car-owner fees, they will have to be keyed largely to producing real value reflected in reduced repair cost burdens to the car owner.

The essential first step in used vehicle safety is the introduction of reliable, periodic motor vehicle inspection systems. Progress by the States in this regard has been more encouraging than generally recognized. Before passage in 1966 of the Highway Safety Act which mandated motor vehicle inspection as part of a comprehensive State highway safety program, 21 States and the District of Columbia had periodic motor vehicle inspection systems.

Since passage of the law, 10 more States and Puerto Rico have adopted it. To aid States in their inspection programs, over $2.6 million in Federal funds have been provided by DOT.

Notwithstanding the progress to date in motor vehicle inspection, it is not fully supported by some States. There have been criticisms about its cost, its unproven relationship to accident avoidance and its possible encouragement of unnecessary repairs by those garages licensed by States to perform the inspection.

To gain fuller public support, consumers must see inspection as a service rather than as a costly enforced requirement. Ideally, such service would involve not only the required safety inspection but also a complete analysis of the condition of each vehicle. Modern automated diagnostic equipment would play a leading role in such a system and provide an owner with an objective appraisal of his maintenance and repair requirements.

The automated diagnostic equipment which these systems would require costs a considerable amount of money. The Department has estimates in the range of $600 million to $800 million. We believe it would be substantially higher. The objective must be to develop a system in which its operating and equipment costs could be recouped through user charges which the owner is readily willing to pay. However, until further progress is made in resolving these and other cost and benefit issues, we would be reluctant to endorse any specific type of automated equipment or systems concerned with either safety or non-safety related inspections. In the meantime, the

Department intends to continue its research and technical assistance to States, primarily concentrated on the safety-related needs.

Among the research projects completed or nearing completion at this time are:

1. A series of four projects to survey current practices in the areas of garage repair, dealer warranty action, owner maintenance of vehicles, and the application and effectiveness of industry sponsored defect recall campaigns.
2. Two projects of a fundamental technical nature designed to develop a better understanding of how vehicle systems degrade with age and use, and how such degradation affects the safety handling characteristics of the vehicle. Safety critical systems covered to date include the steering, suspension, and braking.
3. A continuing series of vehicle inspection and diagnostic programs in the field, whose aims are to determine the safety status of vehicles-in-use and to define the general state-of-repair of the vehicle population. These studies will determine which specific safety-related vehicle systems are most likely to be out of specification.
4. Four important studies to explore new ideas and concepts in the area of vehicle inspection and fault diagnosis. Diagnostic centers, mobile inspection facilities, automated trouble shooting and diagnostic equipment are included here. Fundamental inspection policies and mandates, including

the feasibility of reinspection of crash involved vehicles before their return to the highways, have also been considered.

Other DOT research programs with a direct impact on the repair and servicing of motor vehicles include:

1. The experimental safety vehicle program, in which reduction of body damage in low-speed collisions, maintenance, and ease of inspection, as they relate to safety, will be considered in the design from the ground up.
2. Accident investigation programs, which are gathering precise and detailed data on the fundamental causative factors in accidents, including, where applicable, the effect of worn, damaged or inoperative vehicle systems; and
3. Manpower development programs to define qualifications and skill levels for mechanics.

The full scope of our research in these and related areas has been described in detail in the report that we have submitted for the record. The work has already produced a great deal of useful information, but we recognize that much more is needed. We, therefore, will continue to strongly support the research, which is so necessary to the development of used vehicle safety standards required by the Motor Vehicle Safety Act. Rulemaking for these standards began with a request for comments in November 1968. Delay in completing this rulemaking action is due largely to very difficult technical issues which cannot be resolved without research.

We are now devoting additional resources to this effort. In addition, we are considering the feasibility of using the Federal Government fleet to initially test standards now under development. This would provide the operational experience so necessary to the final adoption of these standards which will have a far-reaching safety and economic impact on the owners of 100 million vehicles.

The Department can also encourage industry and car owners to improve their individual efforts in safety repairs and maintenance. One avenue for doing this is through the consumer information regulations now under consideration. These would require each manufacturer to make available to the purchaser information concerning the adjustment, replacement and repair of degraded vehicle components. This requirement will have the added advantage of introducing competition in building repairability into vehicles.

The first consumer information regulations, which were issued by the Department last year, require manufacturers to provide prospective purchasers with safety information to guide their choice in the critical areas of braking, acceleration and tire reserve load. We have furnished the Committee with a booklet prepared by the Department containing compulations of the data furnished by the manufacturers in compliance with these three regulations.

With respect to the manpower issue, I understand the Departments of Labor and HEW will discuss the programs underway to meet the demand for skilled mechanics. The licensing of repair facilities and certification of

master mechanics have been suggested as means of upgrading the quality of repair. These approaches deserve careful consideration as possible State-operated programs. They might, however, entail very substantial costs, both to the States and to the repair industry, and ultimately to the car owner. Before entering this area, we should be sure that the added costs will, in fact, be offset by reductions in repair costs.

In summary, Mr. Chairman, the Department is seriously concerned with the problem of automotive repairs. Within the context of its safety programs, it will take whatever measures are possible to reduce the need for repairs, simplify the diagnosis of malfunctions which do occur, and improve the quality of repair work performed.

This concludes my prepared statement. I shall be happy to answer any questions the Committee may have.