SOME INTERNATIONAL ASPECTS OF ROAD SAFETY INVOLVING THE NATO COMMUNITY

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•FOR THE past year, it has been my privilege to serve on the U.S. delegation to the NATO Committee on the Challenges of Modern Society (CCMS). Road safety is one of the challenges adopted by this organization. I welcome this opportunity to describe the program to leaders of the highway research community.

Military defense and political consultation have been the 2 primary functions of NATO since its inception. Shortly after taking office, President Nixon proposed that a third dimension be added dealing with social problems of industrial society. The reasoning was this: If 15 of the most powerful nations of the world had learned to work together effectively on mutual problems of military defenses, could they not learn to work together effectively on mutual nonmilitary problems of the environment, health, safety, and well-being of all mankind, in the President's words, "to enhance our environments rather than destroy them"?

The North Atlantic Assembly adopted the President's proposal and created the Committee on the Challenges of Modern Society to bring this third dimension of NATO into action on November 1969.

From the start, the U.S. delegation to the CCMS has been headed by Daniel P. Moynihan, who has developed and enunciated the principles and purposes of this newest subsidiary body of NATO. In his address to the North Atlantic Assembly in October 1969, he said, "Just as advancing technology has given rise to the central social vision of our age, so also has it become the central problem of the age. In massive and dominant proportion, the things that threaten modern society are the first, second, third, or whichever order effects of new technology" (1).

What are some of the degradations to the environment, health, and safety caused by technology? The examples are, unfortunately, legion and include air pollution; ocean pollution; inland water pollution; compelling issues of nutrition, such as cancer produced in animals by chemical food additives as preservatives or diet fads; indiscriminate use of space in our cities; irreversible destruction of natural resources; irreversible destruction of natural beaches, for example, in California; color TV set that floods unsuspecting children with damaging X-rays as a concomitant to their seeing Captain Kangaroo or the Rose Parade in glorious living color; 55,000 people who die every year and the millions seriously injured in vehicle crashes; and the billions of dollars lost in the equally senseless destruction of property.

All of these are the results of technology, pure and simple. People do not die in vehicle crashes in countries where there are no vehicles; children's eyes are not damaged in front of TV sets in countries without TV. These and other serious degradations to the quality of life occur only in the industrialized nations that are impacted by technology. Created by technology, these degradations will be mitigated, if not cured, only by this same technology. With the degradations emanating largely from technological activity in the industrialized nations, it will have to be these same nations—at the highest levels of government—that will have to start the corrective forces in motion.

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We now can begin to see more of the rationale for this new, third dimension of NATO. To quote Moynihan again:

> NATO is unique. For almost two decades now it has carried on, at ever-increasing levels of complexity, a massive system of technology transfer. There has been no such sustained experience in the history of the world. If technology is the issue, NATO is uniquely the forum in which to raise it. Moreover, if the issue is one of pressing urgency, which somehow does not seem to command the attention it deserves, NATO is doubly appropriate, for here is an institution which year in and year out has been able to command attention and response at the highest levels of government.

Thus NATO as an important quorum of the industrialized world, with major experience and success in intergovernment transfer of technology for mutual problems of military defense and related political consultation, is uniquely qualified to spearhead the needed intergovernment transfer of technology for mutual problems in the defense of the world environment.

The thrust of the NATO effort is to command attention and response at the highest levels of government. Toward this end, a somewhat unique approach, suggested by the CCMS Chairman, Gunnar Randers, the Assistant Secretary General of NATO, has been adopted in which a single nation or pilot country assumes the primary responsibility for a given area of activity. It conducts the effort with its own resources, stimulates cooperation with participating countries, and prepares the reports to the CCMS. This pilot-country approach provides for single-country responsibility and leadership to promote more rapid action than usually is possible through multilateral responsibility.

In some cases, 2 countries share the leadership, but there is no major CCMS secretariat in NATO because most of the operational detail and expenses are met by the pilot countries. In effect, the NATO allies have divided leadership responsibilities, and each member nation cooperates with studies led by others even while it might itself be the leader of one or more efforts. It is interesting to note the wide range of pilot studies now being led by member nations.

Study Area	Pilot Nation	Copilot Nation
Open-water pollution	Belgium	Portugal, Canada, France
Inland-water pollution	Canada	France, United States, Belgium
Environment in the strategy of regional development	France	None
Scientific knowledge and decision-making	West Germany	None
Work satisfaction in a technological era	United Kingdom	None

The studies that the United States proposed and NATO approved include air pollution, with Turkey and West Germany; disaster assistance, with Italy; and road safety, nominally alone.

U.S. PILOT STUDY ON ROAD SAFETY

I say that only nominally are we without copilot nations in the road safety study because a number of member nations have assumed leadership in specific project areas within the overall road safety study. The division of workload is as follows:

Project Area	Nation
Alcohol driving countermeasures	Canada
Advanced vehicle inspection	West Germany

Project Area	Nation
Road-hazard identification and treatment	France
Emergency medical services	Italy
Accident investigation	Netherlands

We are now negotiating with other NATO countries for possible leadership roles in pedestrain safety, safety manpower development, and passive restraints. The United States is maintaining leadership in the experimental safety vehicle program that I presently shall describe in more detail.

In illustration, our discussions with Canada on its leading the alcohol driving effort culminated in the following plan:

1. Survey present research and action programs of NATO and non-NATO countries;
2. Develop a model program on alcohol countermeasures;
3. Present model program to international conference and obtain comments from all interested countries;
4. Survey state of the art on "hardware" items and their effectiveness in controlling the problems of drunk driving; and
5. Prepare a report, based on the foregoing, for submission to CCMS and thereafter to the North Atlantic Council recommending specific governmental actions.

Another example deals with our project on road-hazard identification and correction, which is being headed by France. The U.S. liaison role has been accepted by Charles Prisk of the Federal Highway Administration.

Another major thrust of the pilot study deals with our experimental safety vehicle program, which in many ways will put to the most severe test the fundamental hypothesis of CCMS, namely, that this forum can stimulate a significant exchange of technology among a major group of industrial nations. I presently shall describe this ESV program in somewhat more detail; but, here, let me outline the overall structure of the pilot study.

The pilot study comprises a series of projects largely selected from the topics discussed in various meetings with member countries. Each project is keyed to payoff analysis of countermeasures for governmental decision-making. Several projects will be undertaken bilaterally; several multilateral efforts have also been started. The United States, as the pilot country, is leading some projects in addition to the overall study; other countries are leading other projects. Apart from project leadership per se, all NATO governments are ready to participate in varying degrees on the exchange of information called for in the various projects of the pilot study.

All of the projects are directed toward stimulating government action because, although much safety research is still urgently needed, much is already known that can be placed into operating practice and start saving lives immediately. For this reason, the pilot study is oriented not to research as such but rather to government decision-making and action based on a full and open exchange of technology and operational experience.

To be successful, the exchange must be two-way; and, having accepted the responsibility for the pilot safety effort, the United States is most encouraged by the number of member countries that have accepted leadership roles in the various projects that constitute the pilot study. We anticipate that much of the road safety practices of member nations will aid the United States in planning and implementing its safety programs, even as the new U.S. safety technology is helping member nations in planning and implementing their efforts.

The pilot study as such is to end with the submission of a final report by the United States to CCMS in December 1972. It is neither conceived of as being nor intended to become some form of effort continuing indefinitely into the future. The end-point concept maintains as well for individual projects constituting the study. For some, the end point will be a sustaining unilateral, bilateral, or multilateral arrangement, and, once such an arrangement is working satisfactorily, the project will be terminated as a CCMS pilot study effort. In other cases, the project end point will be limited to a report submitted to CCMS with recommendations on permanent or sustained operations, which NATO of course can adopt or reject.

THE ESV PROGRAM

Thus, the heart of this NATO third dimension is to stimulate a significant exchange of technology among a major group of industrialized nations of the world. As I stated earlier, what might prove to be the severest test of this fundamental hypothesis is the experimental safety vehicle program. I accordingly will devote the remainder of my remarks to encapsulating some of the international aspects of this activity; a more detailed treatment is presented in another paper (2).

The concept of government sponsoring the development of experimental vehicles in which safety is the overriding design goal is part of the landmark vehicle and highway safety legislation enacted by the U. S. Congress in 1966. The substance of the program to date under this statutory requirement is as follows:

1. The United States has awarded a contract to each of 3 private companies—Fairchild-Hiller, AMF, and General Motors—for the design and construction of a prototype vehicle to meet or exceed levels of safety performance specified by the U. S. Government. For example, one of the specifications calls for full survivability of the vehicle occupants without serious injury in a 50-mph barrier impact or 70-mph rollover. Details of the design are left to the contractors who are to deliver to the Secretary of Transportation a prototype and backup vehicle that meets the safety specifications.
2. Upon receipt of the 2 complete vehicles from each contractor, the Secretary of Transportation will initiate a program of testing the safety performance of each design. A destructive test under high-speed impact of one vehicle of each design is part of the test program.
3. Based on the results of the comparative tests between the Fairchild-Hiller and AMF products, the Secretary will select one design and contract for the construction of 12 more vehicles of this design. These vehicles will then be used in an extensive test and evaluation program. Their performance will be compared with that of the GM product that is to be delivered to the Secretary 10 months after the products of the other contractors.
4. The results of the tests and evaluations of the safety prototype vehicles will then constitute the technical foundation for issuing new federal safety standards for all vehicles sold in the United States.

The basic goal of the ESV program is to stimulate through safety design of the vehicle as a complete system a quantum jump in vehicle safety performance over the incremental improvements that industry has always made in varying degrees in production vehicles from one model change to the next. Such progress by industry in introducing new safety features must be described as largely evolutionary, with successive improvements introduced only at rates compatible with factors such as sunk cost in tooling and the competitive position in the marketplace. The introduction into the market by industry of a vehicle that is completely new from the safety point is, in fact, comparatively rare. It is precisely to circumvent the constraints inherent in the marketplace and similar considerations, which largely preclude a quantum jump in vehicle safety design by industry, that government sponsorship of ESV's becomes important.

In addition to producing the quantum jump in safety performance, the ESV program has other major purposes. For example, it can mean a reduction in the price the consumer pays for cars having higher levels of safety performance. We strongly believe that the combined effect of a group of safety improvements on the price the consumer pays for the final product will be substantially lower if most of the improvements are designed into the vehicle as a total integrated system from the start rather than as a sequence of add-ons to a basically unchanged vehicle design.

In ESV developments, automotive designers have unique opportunities to develop innovative, low-cost solutions that incorporate all safety requirements into the vehicle at once and yield high levels of safety performance in the end product as a total system. They can optimize and suboptimize the performance and cost of various subsystems of the vehicle that they deem appropriate to meet or exceed the performance requirements of the complete end product. They can establish priorities among all candidate safety improvements, priorities that might not be the same for classes of vehicles either large or small. In short, within the disciplinary constraint of having to design and construct a complete vehicle, designers are afforded the opportunity, in fact, are forced, to make the trade-off analyses among safety improvements.

Still another underlying objective of the ESV program is to examine how a comparatively large number of safety requirements for vehicle subsystems can be consolidated into a smaller number of standards dealing more with the vehicle as an integrated system. For some time we have been concerned about the increasing number of individual standards that collectively will define the safety performance of the total car. We now have in effect some 31 vehicle safety standards, and approximately 170 new standards, changes, or additions to existing standards now under development. Increasing the number of standards is not a good approach from either the engineering standpoint or the effect on vehicle price. We much prefer to move over the next several years in the opposite direction, that is, toward a fewer number of standards that treat safety performance of the total vehicle as a complete system.

Consolidation of safety requirements into a fewer number of standards dealing with the safety performance of the vehicle as a total system is an almost axiomatic concept, but one that as yet has not been tested as a viable approach to government regulation of production vehicles sold to the general public. The ESV program provides an important first step toward validating this principle. One of the key questions that we will be carefully appraising in the ESV program is, How well does the performance of the prototype vehicles overtake the safety standards that are in effect or under development for production vehicles?

Another potentially important benefit from the ESV program also has recently emerged. During the course of our negotiations with various foreign governments on the ESV bilateral agreement, the issue of whether the consent decree in the government's antitrust action in California on manufacturers' cooperating with each other in research in exhaust emission control also applied to safety in the ESV program. We now have a legal ruling to the effect that, in the course of participating in an ESV program with the U.S. Government, the company-to-company exchange and cooperation in research is permissible provided that the government is represented or aware of all transactions. We are particularly interested in developing this new mode of communication between industry and government on the technical issues.

It can be seen that the various reasons for the ESV approach apply to all classes of vehicles. However, the initial U.S. effort has been limited to the 4,000-lb family sedan for several reasons: this class of vehicle predominates on U.S. roads; the incorporation of new safety improvements, especially in the protection that the vehicle affords its occupants in crashes, is less difficult in larger cars than in smaller cars; and ESV programs are inherently expensive from all standpoints—dollars, engineering manpower, and time.

The United States is nevertheless most interested in the development of prototype safety vehicles in the smaller size and weight classes. Although the nearly 5 million vehicles in the under-2,000-lb class represent 6 percent of the total vehicle population in the United States, they are involved in slightly more than 10 percent of all crashes producing serious or fatal injuries. Furthermore, a very strong association has now been firmly established between the weight of the car and the percentage of accidents in which there was a fatality or serious injury in that type of car. For vehicles in the 4,800-lb class, this figure is 3.1 percent and rises to 4.0 percent for 3,700-lb vehicles and 9.6 percent for 1,900-lb vehicles. Thus, the vehicles in the 1,900-lb class have a morbidity-mortality crash incidence more than 3 times that of the 4,800-lb cars.

In addition to safety considerations, our interest in small-sized ESV's bears heavily on the economics of providing safe, personal transportation for low-income groups. One analysis shows that the cost of small-sized cars now priced around $1,800 in the United States will increase by more than 40 percent in 1975 from 1969 levels because of U.S. safety and antipollution standards. This would mean that an $1,800 (Renault, VW, Gremlin, or Pinto) car would cost $2,400. This 40 percent estimate probably does not reflect all of the rule-making actions (new standards and amendments) that we now are developing. It is unmistakably clear that, if these cost data are correct, we might be on a course that will ultimately drive the low-cost, economical car out of the U.S. market. This is an end result that our government considers undesirable from every standpoint—transportation cost, fuel consumption, highway capacity, parking space, air pollution, and provision of personal transportation for low-income groups.

It should be noted, however, that these estimates result from adding the cost of each improvement to the price of the car incrementally. The need for an ESV approach to small-car safety is apparent, particularly in the difficult areas of cost-safety tradeoff analysis. Let me offer this hypothetical example: Consider that 2 safety improvements have been perfected. The first is a high-performance braking system with computer-controlled sensitivity to impending skids or crash impacts, and the second is a structural configuration that would enable occupants to walk away unharmed from a 70-mph crash. Either improvement is feasible within the size, weight, and price constraints of a 2,000-lb vehicle, but both are not. The choice, therefore, is either improvement but not both. In this type of trade-off situation, I would choose the structural improvement for the lightweight car because the braking performance of at least some small cars is already quite good while structural crashworthiness is not. On the other hand, I might choose the braking improvement for heavier cars because the reverse is true.

As difficult as such choices might be in an ESV development program, they are much more difficult, but nonetheless inexorable, later in designing for production vehicles. The ESV program thus might be the forerunner to different safety requirements for different classes of vehicles. Moreover, with such decisions being made in parallel small- and large-car ESV development, we might be laying the foundation for a new approach to vehicle safety regulation, namely, one in which priority safety requirements might vary between different classes of vehicles—for example, between large and small vehicles.

Thus, while we have had to limit our ESV program for the reasons cited to the 4,000-lb ESV development, similar programs in the 3,000; 2,000; and even 1,500-lb family sedan classes are also of major importance to us. The need for broadening the base of ESV development is patently clear. In this regard, in February 1971 at the first technical meeting of the U.S. Pilot Study on Road Safety for the NATO Committee on the Challenges of Modern Society, we proposed that our 4,000-lb ESV developments become the foundation of a broad program of international cooperation among nations, each of which would be sponsoring ESV developments in parallel with the U.S. effort. Since then, it has been my privilege to discuss this program separately with government and industry officials of every NATO country having a major automotive industry. I have also had similar discussions with representatives of Sweden and Japan and their industries.

On November 5, 1970, the U.S. Secretary of Transportation and the Minister of Transport of the Federal Republic of Germany signed a bilateral agreement under which the German Government supported by its industry will develop a 2,000-lb ESV and exchange information and technology with the U.S. Government in our current 4,000-lb ESV program. On November 18, 1970, the U.S. Secretary of Transportation and the Minister of International Trade and Industry and the Minister of Transport of Japan signed a similar agreement.

Intensive discussions are now in progress on similar bilateral agreements between the United States and France, the United States and the United Kingdom, and the United States and Italy. A meeting to exchange viewpoints on the specifications for this class of vehicles will be held in Paris under the sponsorship of the French Government in conjunction with the Renault and Peugeot companies. Although the thrust of the meeting centers on U.S.-Germany-Japan exchanges, the other nations and their industry representatives will participate fully in anticipation of bilateral agreements being completed soon with the United States.

I will not detail fully all aspects of the cooperative international program, but let me briefly list some of the general activities that we plan to pursue:

1. Transmitting all engineering and technical data that the U.S. Department of Transportation has developed during the past 3 years with regard to the program definition phase of the ESV procurement;
2. Meeting with foreign automotive engineers so that they and U.S. Department of Transportation engineers can exchange information on the ESV program;
3. Making available to the participating governments and their automotive firms selected to design the ESV all engineering and technical data developed in the U.S. ESV program;
4. Arranging for the interchange of data among all countries involved in the development of the ESV; and
5. Providing for such other technical assistance to the participants as may be required.

One of the many issues to be resolved in order to have an international effort of this nature work relates to preexisting patents as well as new patentable ideas that may evolve. We have communicated U.S. patent policy in this regard to every government that we have invited to participate in this effort. We recognize, however, that patent laws vary among countries. For this and several other reasons, our approach has been to reach a separate bilateral agreement with each country that is prepared to sponsor an ESV program in cooperation with the United States. Significantly, our agreements with both Germany and Japan call for strong cooperation with other governments that later choose to sponsor ESV developments.

To digress, the question arises as to the participation of Japan, which is not a NATO member, in this program. Recall that the United States is the pilot country of the study and is solely responsible for its report to CCMS. Under the CCMS arrangements, the pilot country is largely left to its own devices as to how it obtains the relevant operational experience and otherwise collects the information that it finally includes in its report on technology transfer in this problem area. The agreement is between Japan and the United States, not between Japan and CCMS. However, the United States on its own initiative can extract from the results of its cooperative efforts with the Japanese whatever lessons (or problems) are appropriate for inclusion in its report to CCMS. The pilot study is examining the process of technology transfer even while the substance of technology transfer is occurring in the separate bilateral arrangements.

In initiating these agreements with the German and Japanese and, it is hoped, with the Italian, British, and French Governments, we are most cognizant of formidable obstacles that can prevent as free a flow as we would hope to achieve of new automotive technology across all boundaries of the industrial world. These obstacles include the proprietary rights of private manufacturers who discover new technology of vehicle safety performance or the favorable trade balance sought by all countries. We recognize the stimulus to discovery provided as a consequence of protecting legitimate self-interests.

We also recognize the urgency of the need to pool our technology in vehicle safety and to find effective ways to accomplish this transfer. If, as miraculous as it would be, an absolute cure for cancer were discovered somewhere in the world, I am sure that it would move most rapidly across corporate and international boundaries. Our challenge is to find ways to stimulate a similarly rapid flow of the automotive safety breakthroughs across corporate and international boundaries.

CONCLUSION

I would emphasize that the technology of road safety, especially in vehicle design for safety, is changing very rapidly. In fact, it is changing so rapidly that some of us are now cautiously speculating that, spearheaded by the ESV program, a generation of vehicles might be at hand in which the chances of a vehicle occupant being killed or seriously injured in a 50- to 60-mph crash will be almost nil. This technology might be producing what for a substantial part of the traffic death and serious injury problem would be the analog of what the Salk vaccine was to the polio problem. I might add that the vehicle crash—as the No. 1 killer of our youth—has been producing more than 20 times the death tolls that polio ever produced in the worst epidemic years. This brings to mind that it was not many years ago that no solution was in sight for polio.

We know that we are on the verge of breakthroughs that can eliminate the traffic crash as the No. 1 public health problem of our young people in the United States. With these solutions in sight, what we are striving to accomplish in effect is what medical profession and health scientists have been doing for years. This is to expedite the flow of effective countermeasures to public health problems across international boundaries.

We are confident that, with NATO bringing the collective strength of this important quorum of industrialized nations of the world to bear on traffic and other challenges of modern society, this transfer of responsible technology will occur more rapidly. As a result, the day will come much sooner when all mankind looks back on traffic deaths as memories of irresponsible technology in uncivilized societies of the past.

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