James L. Covil is a Senior Vice President for Wilbur Smith Associates and is responsible for transportation policy and planning. He has spent his entire professional career of 30-plus years with Wilbur Smith Associates.

Mr. Covil is a registered professional engineer in three states and is a member of the IVHS America Coordinating Council and serves on two of its technical committees. He earned a masters degree in transportation engineering from North Carolina State University.

GENERAL SESSION
Tuesday, September 29, 1992

James Covil
Senior Vice-President, Transportation Policy & Planning
Wilbur Smith Associates

INTERMODALISM: WHAT IT IS AND HOW IT WORKS

Transamerica Transportation Corridor
Transportation Options for the Twenty-First Century

My presentation today concerns a study which Wilbur Smith Associates is undertaking on behalf of 11 states and the Federal Highway Administration. We are pleased that Cal Grayson and the staff of the Transportation Center are working with us on this feasibility study. Also, Dr. Ben Allen of Iowa State University is working with us on this study.

Introduction

The study is in response to the 1991 DOT Transportation Appropriations Act which included a requirement entitled the “Interstate 66 Feasibility Study.” As specified in the Act, this study will examine the feasibility of a transcontinental transportation corridor. Within that corridor, a wide range of alternative transportation modes and technologies is to be examined. Because of the broad scope of the study and the confusion caused by calling it I-66, the study is now referred to as the Transamerica Transportation Corridor.

The transcontinental corridor that is being studied is 400 miles wide and 3,000 miles long, stretching from the east coast to the west coast. The
corridor is generally located between I-70 and I-40 as shown in Exhibit 1. One of its unique characteristics is that the corridor is wider than most corridors are long.

The corridor includes an eastern terminus, generally in the Commonwealth of Virginia area, and a western terminus somewhere in California. As shown in Exhibit 2, the location of the termini is one of the matters to be investigated in the study.

Exhibit 1

Because we are in Kentucky today, there is another interesting aspect of the legislation which required this study. The legislation specifies that the corridor to be studied in Kentucky is to be centered on the cities of Bowling Green, Columbia, Somerset, London, Hazard, Jenkins, and Pikeville.

A steering committee is guiding work on the study and they have established certain ground rules. These include the examination of all modes and technologies which might be deployed within a 30-50 year time horizon. Transportation technologies include fixed guideway options such as MAGLEV, as well as new opportunities presented by the introduction of Intelligent Vehicle Highway Systems. Both passenger and goods movement are included.
The innovative nature and breadth of this study is somewhat unprecedented in transportation planning work. This derives from four unique features:

- Scale of the project (coast-to-coast)
- Futuristic visions (30-50 year time horizon)
- Multimodal scope (highway, rail, pipeline)
- Joint use opportunities (communications, electrical transmission, water pipelines)

A Transcontinental corridor must tie-in somewhere
Because of its unique characteristics, this study provides an unprecedented opportunity to appraise the potential of IVHS technologies to create a second-generation interstate highway system; a system that could achieve a major boost in our national productivity. In fact, we anticipate that this IVHS extrapolation will become another important factor in defining the overall direction and the research and development priorities for IVHS.

Study Approach

This study is “strategic” in nature. It is not concerned with specific alignments and will not become mired in minor details. Rather, it will focus on such strategic issues as:

- Is a new transcontinental transportation corridor warranted?
- What features should be included in the second-generation interstate highway?
- What new emerging modal, multimodal, technological, or joint use opportunities and concepts make sense?
- What can such transportation concepts do for the nation’s economy?
- How much impact will the time and cost savings have on the nation’s productivity?
- Given the twenty-first century vision of the study, what legal, institutional, legislation, funding, and public policy changes will be needed?

To answer these questions, the study will examine a wide range of alternatives, as shown in Exhibit 3. The range of transportation technologies includes IVHS, encompassing the full range of advanced traffic management systems, advanced traveller information systems, advanced vehicle control systems, and commercial vehicle operation technologies.

Within its multimodal concept, the study will look at new technologies, including joint use by both highway and high-speed rail systems. As you can note in Exhibit 4, the high-speed rail system includes a transcontinental route that ties together some of the other high-speed rail proposals that have been and are being considered across the nation.

Within this system concepts, feeder links to major cities also are an item under investigation. Particularly, if this were to become an ultra-high-speed corridor, travel between major cities could be altered fairly
## Modes and Technologies

<table>
<thead>
<tr>
<th>Modes</th>
<th>Guideway</th>
<th>Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highway</td>
<td>IVHS</td>
<td>Multiple trailer trucks</td>
</tr>
<tr>
<td></td>
<td>High Speed</td>
<td>Heavy trucks</td>
</tr>
<tr>
<td></td>
<td>Heavy Weight</td>
<td>Intelligent vehicles</td>
</tr>
<tr>
<td></td>
<td>Guideway propulsion</td>
<td>Guideway propelled vehicles</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>Others</td>
</tr>
<tr>
<td>Rail</td>
<td>High speed steel wheel</td>
<td>High speed steel wheel</td>
</tr>
<tr>
<td></td>
<td>MAGLEV</td>
<td>MAGLEV</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>Special Multimodal vehicles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Others</td>
</tr>
<tr>
<td>Pipeline</td>
<td>Freight container pipeline</td>
<td>Capsules</td>
</tr>
<tr>
<td></td>
<td>Pneumatic</td>
<td>&quot;Logs&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;Closed circuit&quot;</td>
<td>Others</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>Others</td>
</tr>
</tbody>
</table>

### Exhibit 3

HYPOTHETICAL NEW TECHNOLOGIES SYSTEM

Exhibit 4

September 28-30, 1992

Prepared by W&K Computer Services – GIS Department
drastically. To capture this benefit, feeder links will need to be established as conceptually demonstrated in Exhibit 5.

Within this context, the study is a feasibility study, intended to reach conclusions and to make specific and defensible recommendations. To make these determinations, feasibility will be judged at four different levels as shown in Exhibit 6.

- **Conceptual Feasibility** - At the conceptual feasibility level, the alternative transportation modes, modal combinations, technologies, and joint use opportunities will be evaluated.

- **Institutional Feasibility** - At the institutional feasibility level the supporting mechanisms will be considered, to determine what types of institutional changes might be needed to enable the transportation concepts to be seriously considered.

- **Corridor Applicability** - Then the feasibility of major investments being applied within the prescribed corridor region will be assessed.

- **Segment Applicability** - And, finally, the feasibility of specific corridor segments will be evaluated. This could include segment issues and priorities within the context of a coast-to-coast facility.
As you are aware, initiation of the national IVHS effort was predominantly motivated by emerging concerns regarding:

- Completion of the Interstate System,
- And the associated question of “what next?”, and
- Listing and projected congestion in urban areas.

This study expands the scope of IVHS activities to include:

1. Its potential impacts on economic development for rural sections of the country.
2. Its influence on design and deployment of a potential second-generation interstate system.
3. Its competing and complementing links to other modes of interstate transportation.

To a large extent, IVHS activities are “retrofit” oriented at the present. This study, however, will permit us to consider how IVHS could be incorporated in a new, or partially new, facility. By looking out to a 30-50 year time horizon, we anticipate that IVHS can influence the reshaping of our interstate transportation system.
Illustrated in Exhibit 7 is an example range of configurations, both IVHS-based and multimodal-based, that are being addressed. Speed and automation must be considered as two of the important variables in any consideration of future surface transportation. Our conventional interstate is shown here as limited to 65 mph speed. Various IVHS-based concepts might potentially raise speeds as high as 150 mph or so. Rail and MAGLEV modes, similarly, can raise surface transportation speeds to the range of 150 to 300 mph.

The advanced vehicle control system components of IVHS are a particularly intriguing aspect of the study. This is due to the fact that we are talking about a totally new facility that could be designed to accommodate such technologies and to demonstrate their technical feasibility. As can be seen in Exhibit 8, a fully automated interstate could include roadway speeds from 120 to 150 mph. This is certainly not unrealistic when one considers the routine operating speeds currently being obtained on the German Autobahn. Given the study's time horizon of 30-50 years, we are not at all convinced that the advances in technologies might not even exceed the speeds postulated in this exhibit.

Another aspect of advanced vehicle control systems is concerned with commercial vehicles. Trucking companies are always seeking ways to enhance their productivity. Currently, much attention is focused on triple-bottom trucks. Advanced vehicle control system techniques could, over the next 30-50 years, permit vehicle trains of lengths that can only be postulated at this time. Increased commercial vehicle speed limits could be a second result. A special lane on a new interstate link might allow a
**NEW AUTOMATED INTERSTATE SYSTEM**

- 120/150 mph Multi-Lane Roadway
- Automatic Merge/De-Merge
- Vehicle Platoon Stabilization
- Automatic Emergency Override
- Destination Selection/Routing

Exhibit 8

half dozen trailers to be safety controlled by one operator—possibly with an increased speed limit.

**Economic Impacts**

We are all aware of the big gains in productivity that derived from construction of the Interstate System. These primarily derived from the improvement in average vehicle speeds and from improvements in safety. These benefits can be increased even more through the use of IVHS technologies as part of a second-generation interstate system. This study will address the travel efficiency benefits that might be derived.

Additionally, the economic analysis will consider the effect of improved transportation upon the general economy. With increased speed and enhanced safety, transportation costs are expected to be reduced. These, in turn, will generate reductions in the cost of doing business, thereby reducing the prices of goods and services. This will increase the competitiveness of goods and services, thereby leading to increased sales. In turn, this will require increased production along with more employees and capital investment. The analysis to be undertaken in this study will capture the full range of economic benefits that a new twentieth-century facility could generate.

**Multimodal/Intermodal Elements**

The scope of this study recognizes that IVHS-based roadway transportation must be both competitive with and complementary to other modes. Also, it must consider the potential technological advances in these other
modes. Consequently, this study will consider possible combinations of deployment of advanced transportation modes such as high-speed rail and road technologies.

Indeed, the study includes elements of both multimodal and intermodalism. We have chosen to distinguish these two elements on the basis of the following definitions:

- **Multimodalism**: A process of looking collectively at all modes of transportation.

- **Intermodalism**: A process of looking at linkages, interactions, and movements between transportation modes.

Intermodalism, therefore, is an element within multimodalism. That is, intermodal transportation can only occur in a multimodal environment.

There are a number of intermodal linkage elements that the study is addressing. For instance, a transcontinental transportation facility clearly must include linkages to ports on the East Coast and the West Coast. Additionally, there may be some opportunities for linkages at the Mississippi River. The importance of these port linkages is quite significant in the concept of a land bridge as a substitute for traffic through the Panama Canal.

In addition, the intermodal linkage aspect includes the potential to provide linkages to remotely located airports. These airports could be located at some distance from major population centers and utilize high-speed road and/or rail transportation as the means of connecting wayports with the population centers that they serve.

If the feasibility study shows that a high-speed highway is feasible, linkages to rail terminals in various cities certainly must be considered. On the other hand, if a high-speed rail system is found to be feasible, its passenger terminals must be linked into the total transportation system. If both high-speed highway and rail were to be found to be feasible, linkages to major centers still are required.

And finally, intermodal opportunities to transport automobiles and their passengers for long distances must be considered. Conceivably, this would be a high-speed counterpart to the Autotrain operated by Amtrak along the East Coast.

The study is considering the wide range of impacts that would accompany these various transportation alternatives. First, a high-speed highway certainly would divert other highway traffic, particularly if speed differentials are of the magnitude that we are postulating. Additionally,
it would have an impact on rail passenger and rail freight transport and even would impact upon air travel.

If the transportation facilities include a heavy-duty truck facility with transparent state borders, this could have a significant impact upon rail traffic. This would be particularly true if the road train concept was found to be feasible.

High-speed rail systems and MAGLEV certainly will have a significant impact upon both highway and air travel.

Finally, if pipelines are included as part of the joint-use opportunities, this could have various impacts on highway and rail transportation.

Conclusion

The work plan for the Transamerica Transportation Corridor has been structured to produce a number of study products, some of which do not depend upon a finding of feasibility for a new transportation facility. In particular, the study includes assessments of various modes and advanced technologies within a multimodal and intermodal environment. This should benefit other assessments of future modes and technologies as we explore the opportunities to weave such facilities into a seamless transportation system that achieves the advantages each can offer.

Additionally, the study will determine the feasibility of various elements of the transportation system in this immense corridor, something that will be valuable in defining the transportation in the 19 states through which it passes. In so doing, the study is looking for ways to enhance feasibility. Probably the most dramatic way of enhancing feasibility is to make this facility something that is different. Building a conventional interstate highway would have very little opportunity for dramatically affecting transportation on a transcontinental basis. On the other hand, by looking for innovative and exciting new ways to provide transportation, the feasibility of such a facility may be enhanced. As already mentioned, this could be in terms of improved productivity within our nation. Additionally, it could well provide an opportunity for testing advanced technologies within an entirely new transportation facility.

And finally, important study products encompass new visions regarding funding, policy, and institutional arrangements which will be needed to support a whole new concept of multimodal/intermodal transportation on a dramatic new scale.

The Transamerica Transportation Corridor is currently in its early stages and, therefore, we can only outline the direction it will take and its expected significance. The synthesis and analysis of new transportation
concepts is extraordinarily challenging. We anticipate that the results will be very important for the future of interstate and regional transportation and for the concept of an integrated multimodal and intermodal transportation network.