

NATIONAL FREIGHT SYSTEM CONCEPT

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Background – Articulating the Need

This is an era where people move freely around the globe. “The world is a small place” is a phrase people often use when they realize they share common acquaintanceships with others in far-flung or unlikely places. The phrase, however, applies just as well in the realm of goods movement. The United States is firmly planted within the global economy, and U.S. consumer needs are met by producers across the globe. More and more, items used in everyday life are manufactured overseas and shipped to the U.S.

China is currently the third largest exporter in the world and over 21 percent of Chinese exports are destined for the U.S. marketplace. An increasing volume of imports will come from China as more manufacturing relocates there. In fact, the value of Chinese imports grew 97 percent from 2000 to 2004. The expansion of international trade agreements and the continuing shift of the locus of manufacturing eastward will assure that other Asian countries are also shipping increasing amounts of goods to the U.S. India and Vietnam are two examples.

The success of this trend hinges on how easily goods can move from producer to consumer. For all these goods to reach the end users, commerce is relying more and more on efficient transportation. Efficiency gains in production (of which transportation is a component) are passed along to consumers.

Beginning in the 1980s, firms have implemented inventory-leaning practices such as just-in-time (JIT) manufacturing to reduce the logistics portion of cost of goods and services. According to the Council of Supply Chain Management, total logistics costs (transportation plus logistics) accounted for 9.5% of our nominal Gross Domestic Product (GDP) in 2005. In 2005 U.S. GDP was \$12,455.8 trillion (current dollars), which implies a total logistics bill of about \$1.18 trillion. (According to the Commerce Department’s Bureau of Economic Analysis, the transportation component of GDP alone was \$320.4 billion in 2005.) Each percentage reduction in logistics as a portion of GDP is equivalent to \$124.6 billion available for other economic activity.

Total logistics costs ran about 11 percent of GDP in the mid-1990s. Logistics professionals were able to harvest the “low-hanging fruit” of obvious improvements since then, such as consolidating distribution centers, containerizing, implementing JIT delivery of components, etc. The public sector enabled many of these improvements by facilitating faster and more reliable transportation. One notable example is the Alameda Corridor, a 20-mile long subsurface rail line that links the ports of Los Angeles and Long Beach with the nation’s cross-continental railroads. The Alameda Corridor removed truck drayage from L.A.’s highways, improving the movement of both goods and people within the region.

Firms continue to innovate and will lean out their logistics processes. One role for the public sector is to examine where additional efficiencies can be achieved.

Freight transportation infrastructure in the U.S. is aging and declining in quality. America's premier highway system celebrated its 50th Anniversary last year—the Interstates were planned over half a century ago. Construction began on them in the 1950s, and the network is showing its age. The average age of bridges in the Interstate Highway System is 38 years old. Of all U.S. bridges, 27.5 percent are currently rated as deficient, and 22 percent are “functionally obsolete,” meaning they cannot handle the type of traffic that our modern society and economy require. The Federal Highway Administration (FHWA) estimates that bottlenecks on the freight highway system result in \$7.8 billion in direct user costs, as well as \$4 billion in delay costs, annually.

Railroads were designed and built in the 19th Century. Since their heyday, railroads have shrunk dramatically. Class I railroads have shed approximately half their track mileage since 1930. They have become leaner, focusing on profitable long-haul and intermodal business, but are currently operating near capacity. Also, eastern and western railroads do not link up directly, which impedes cross-continental rail shipments.

For the U.S. to remain competitive in a global economy, the factors described above must be addressed. One solution is a national freight system which focuses on a dedicated freight network. Figure 1 lays out a rough approximation of what a freight system could look like at the national level, postulating a number of east-west corridors as well as north-south corridors. These corridors would meet in a limited number of nodal exchange points, where goods are allowed to enter or leave the network. Once in the network, goods would move seamlessly to their destination.



Figure 1

Core Element of the National Freight System: Development of a Separate Freight Movement Network: Creation of a dedicated all-freight transportation network.

- The actual physical composition could take many forms, including technologies which are unknown or only emerging today. This would likely require a significant amount of acquisition of right of way (ROW). A new technology could, conceivably, be built on existing ROW, such as on the Interstate Highway System, but new ROW would be required for segments of the system intended to bypass congested urban centers.
- An all-new system that separates freight would move freight seamlessly without interacting with passenger travel. This would benefit both passengers and freight interests. Motor carriers currently schedule shipments to occur during off-peak hours, when this is possible. Freight railroads also must alter their operations to accommodate commuter rail service, such as along the busy eastern seaboard. Removing trucks from crowded highways will improve mobility and safety for automobile drivers.
- An all-new system for freight movement could be designed to more accurately reflect the needs of shippers. As the U.S. population continues to shift westward and southward, demand for goods movement also increase. And as the U.S. economy moves further from heavy manufacturing, shipments will tend to be smaller, lighter, and more frequent. One suggestion is that Maglev—an emerging but unproven technology for freight—could be used in conjunction with a standardized shipping container in a fully automated system. This would have the benefit of dramatically reduced shipping times and labor costs for goods movement.
- Potential issues:
 - Equity considerations: There would likely be a negative reaction from the general population to a proposal that used public authority and resources to benefit freight alone.
 - Integration with Interstate: Building a new system on the ROW of the Interstates has the effect of projecting the new system onto the Interstate Highway System, which, as detailed below, was planned and laid out over 60 years ago. This would not address the need for a system that responds to modern production and population trends.
 - Building on new ROW: Likely face significant public opposition as well, as has been demonstrated in all major infrastructure projects in the nation over the past years. There are myriad legal and regulatory entanglements involved in building infrastructure on greenspace.
 - Cost: Depending on the system selected, planning and constructing an all-new nationwide system would likely result in a final tally in the trillions of dollars.

Alternatives: In evaluating any proposal, identifying alternatives can help crystallize its strengths and weaknesses.

Do Nothing Alternative

The U.S. possesses a mature economy with a relatively highly paid work force. The U.S. continues to move away from heavy manufacturing and toward a service-based economy. As manufacturing moves offshore—and increasingly to China and other parts of Asia—its consumer goods will come from there as well. In addition to the changing structure of the U.S. economy, the U.S.’s transportation networks are built out and increasingly congested. In the absence of a concerted effort to address how and to where goods will move in this country, congestion in the nation’s freight distribution system will result in a diminishment in Americans’ standard of living. It will take longer, and cost more, for goods to reach markets and ultimately consumers.

The nation’s economic competitiveness will be severely impacted if it becomes more costly and inefficient to move goods into and out of the country. American products will be at a disadvantage to those from regions with more efficient transportation networks. China, for instance, is able to build brand new transportation networks on “greenfields,” which allows them to construct systems that are up-to-date with adequate capacity and utilizing the latest technologies to manage flows. American railroad networks were originally laid out in the 19th Century, and our premier highway network was planned in the first half of the 20th Century. Those areas that can plan for today’s economic realities are given a *de facto* head start on the economic playing field.

Incremental Improvements Alternative -- Evaluation and Adaptation of Existing Networks

The current pieces of the goods movement distribution system—the highways, railroads, and terminals—would be adapted to meet the needs of a new freight system. A national-level vision of what the system would be achieved by researching, evaluating, and correctly identifying where, across all modes in the current surface transportation system, improvements could be made to reach the same objectives.

This method could utilize rail for line hauls and truck for short hauls, as is currently common, but could utilize new technologies (e.g., Maglev) in specific sites, new infrastructure (e.g., bypasses or truck-only lanes in urban areas), or new operational improvements (e.g., operating the current system 24/7) to make the movements across modes as seamless as interlining of airline luggage.

This method has the advantage of building on the current federal system of locally determined solutions to achieving national priorities.

Comparables: the Interstate Highway System

The Federal government has had experience in designing and implementing several significant national networks and corridor programs. These include the Interstate Highway System, the National Highway System, and several other smaller-scale corridor programs.

The Interstate System has often been called the greatest public works project in history. The Interstate System is a 46,876-mile-long system of state-owned and federally assisted highways. Initially authorized in the Federal-Aid Highway Act of 1956, it was based on a concept that was developed and debated since the 1920s. In a real sense, the Interstate Highway System was a national corridor program: Its purpose was to interconnect cities and other major destinations. The routes were almost all selected by the Bureau of Public Roads, the predecessor of the Federal Highway Administration (FHWA). The program was funded, almost exclusively, by dedicated revenues apportioned to States by formula.

The Interstate System was intended to improve operation of an existing mode of transportation, the motor vehicle, by harnessing known techniques of highway engineering to improve the safety and efficiency of passenger and freight transportation. The motor vehicle was in widespread use and overwhelmingly popular, with officials having every reason to predict that its use would continue to grow. By 1955 and 1956, when Congress was developing the legislation needed to launch the program, there was no doubt about the need, no concern about our ability to pay for it, just which funding mechanism was preferred, and no question about our capacity to build it. There also was, quite literally, no opposition to the Interstate System; even groups you might think would be opposed (transit and rail) expressed no opposition. The media were broadly in support, with the Hearst newspaper empire particularly so. The only controversy involved methods of financing. It not only had President Dwight D. Eisenhower's backing, but he was one of the chief instigators of the initiative to get the job done. Once the decision was made to use highway user tax revenue to pay for the Interstate System (whether to finance bonds or the pay-as-you-go method that was adopted), officials could be certain that revenue would continue to grow over the years.

Engineers and professionals developed and sold the concept and it worked well in greenfields, but non-engineering issues required multi-disciplinary and political solutions in metropolitan areas. Although the Interstate System faced no opposition in the mid-1950's, its construction proved highly controversial, especially in cities. This generated a network of opponents and a series of Federal and State environmental and other laws (including historic preservation and right-of-way acquisition requirements) that require needed review for any major Federal action. Where court cases on Interstate projects were virtually unheard of until the late 1960s, today they often are anticipated parts of project development (almost as if they appear on the project development flow chart).

Central to the Interstate vision was the fact that it was based on the most popular form of personal transportation ever devised. Its use was so widespread that everybody in the country could visualize the benefits they would receive and was looking forward to them. President Eisenhower didn't have to convince anyone of the need or the desire,

only of the means and timing of satisfying them. Although it might be possible to create such a vision for a national freight system, the Interstate System will not provide a blueprint for how the task could be accomplished.

Comparables: the National Highway System

The **National Highway System (NHS)** totals approximately 161,000 miles of public roads and includes the Interstate Highway System as well as other roads important to the nation's economy, defense, and mobility. The NHS was developed by the Department of Transportation (DOT) in cooperation with the states, local officials, and metropolitan planning organizations (MPOs).

By the 1980s, it was obvious that with shifts in its population and the alteration of its economy, the US had many more places worth connecting than it had in the 1950s. The American Association of State Highway and Transportation Officials (AASHTO) proposed the creation of a "Highways of National Significance" program. In the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, Congress adopted the NHS program, formally approving the system in the National Highway System Designation Act of 1995. The NHS has been funded by formula since then.

However, unlike the Interstate System, which had a broad constituency, the NHS was largely an "inside the Beltway" concept that interested only transportation professionals. Within the highway community, it was seen as the post-Interstate program in an era when the Federal Government should focus on national objectives and let State and local officials have maximum say over State and local concerns. It lacked many features that gave the Interstate program its status as a national vision (e.g., no cost-to-complete commitment, no uniform design standards, no national tracking of status, no unique signing, no clear beginning or end point, and no real public or media awareness). On the other hand, it shared with the Interstate System the fact that it involved known, widespread, popular technology and challenges that could be addressed based on many years of experience.

The fundamental flaw of concept was that it spanned different functional classes with different geometric standards, and with no intent to bring all NHS routes to a common high standard (an intentional response to constituent qualms). The then-proposed follow-on "National Transportation System" did not materialize because it was a concept hastily conceived and thus lacked national backing. In the end, the NHS has proven to be a disappointment as a national vision. It has failed to ignite a sense of mission even within the highway community.

Comparables: Other Corridor Programs

The ISTEA of 1991 also identified 21 corridors as **High Priority Corridors** and established a program for improving them (about \$1 billion in earmarked funds and \$50 million in discretionary funds). Over the next decade and a half, Congress identified additional corridors (FHWA had essentially no input in this) and there are now 80 such corridors (with some overlap between corridors).

In the Transportation Equity Act for the 21st Century (TEA-21) of 1998, a discretionary program called the **National Corridor Planning and Development and Coordinated Border Infrastructure** (or NCPD/CBI program) was established to fund improvements to these corridors, to fund improvements to the land borders with Mexico and Canada, and in some cases (after specific considerations) to other corridors. This program was nominally a discretionary program but by 2002 (and for the remaining years of the program) all funding decisions were made by Congress during appropriation legislation. Also, by 2003, most of the funding was for corridors that were neither designated as High Priority Corridors nor that served the land borders. About \$1.3 billion was eventually allocated for NCPD/CBI projects over the life of this legislation.

In 2005, The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) created a fully earmarked program (called the **National Corridor Infrastructure Improvement Program**, in section 1302). The funds earmarked over the life of the legislation were about \$2 billion. The legislative language implies that the earmarked funds are for corridors of national significance, yet there was no broad support for any “network” or “system” of such corridors.

Lessons Learned From Corridor Programs

The great success of the Interstate Highway System has not been duplicated by any of the succeeding programs. Reasons for this include:

1. These successor programs did not have a national buy-in.
2. The successor programs lacked an imperative or urgency to complete a “system.”
3. The successor programs were subject to earmarking
4. Some of the earmarks were for projects that did not seem to be national in importance.
5. The successor programs were insufficiently funded.

Some of these lessons are interrelated. For example, the earmarking reduced the national buy-in because it seemed to compromise the fairness of the program.

Additionally, any major national transportation construction initiative that lacks a broadly supported notion can reasonably anticipate that it will face legal challenges based on federal and state environmental and other laws. In the absence of a track record, we cannot foresee all potential issues that might arise about a national freight system, but they could include adverse environmental impacts and right-of-way acquisition concerns.

Considerations of the features of a Comprehensive Scenario

If a new corridor program is to be successful:

1. It may need to be walled off from being changed for enough years for the program to be judged as “potentially a success.”
2. The basis for funding must be perceived as fair.
3. The scope of the program (e.g., the number and type of corridors) must be consistent with the funding.
4. It must operate long enough at a relatively low dollar amount in order to establish a track record.
5. Further legislation expanding the funding and expanding the scope of the program must retain the wall and must retain the fair basis of funding.

Institutional Concerns

The Commission could play a fundamental role in the national freight system, creating a vision for the system and giving the charge for its undertaking to the Federal government. Whatever form the national freight system concept takes, it could be an infrastructure program that rivals the Interstate Highway System in its scope. Thus, a clear vision that will have appeal for the general U.S. population is necessary.

The benefits of the national freight system, economic as well as mobility and other, must be enumerated for the general population to buy into it. As described above, the Interstates had broad popular support, in part because highways were a relatively well-known technology and the program was seen as greatly enhancing highway travel which facilitated the mobility aspirations of the citizens. Generating popular support for the national freight system will require a clearer articulation of its ultimate physical form (e.g., is it a separate network or targeted modifications to the existing system), funding sources, and benefits in order for the American people to support it. The lessons learned from the corridor programs would suggest that the program begin at a smaller scale to generate a positive track record.

Such an infrastructure program would require authorization by Congress, and so the Commission’s recommendation should contain as much specificity as possible in order to avoid the creation of another earmarked program that is a network in name only. As indicated above, the source of funding must be perceived as fair

Articulation of Federal Role

At this time, it appears that the role of the Federal government would be, once charged by the authorizing legislation, to take the goal/concept to implementation and ultimately function in a stewardship and oversight role. This would need to be clarified.

The Federal government could be charged in taking the lead, working in close coordination with States, localities, and industry, to study and plan the ultimate national freight system. The level of standardization would have to be determined. The highway model avoids a “one size fits all” approach, relying on input from those units of government that best understand their local circumstances.

The Federal government could have an ownership role (in full or in part), management role, a regulatory role, or a hybrid relationship with other owners. For example, as in other transportation functions, the Federal government could play a regulatory role in terms of ensuring the national freight system met performance standards (including safety) in operation as well as construction, environmental, historic, and cultural impacts while the system was being put into place.

The Federal government could play a fundamental role in the financing of the national freight system. This could include the collection of revenues for the system as a whole, allocating those funds either in direct management or in the form of grants, credit or credit assistance, or the support of public-private partnerships through licensure agreements.

State and Local Roles

In addition, if the current federal-aid highway program is used as a model, the states would have a role in construction of the system.

The primary role for local governments, primarily metropolitan planning organizations (MPOs), could be in the planning of what types of facilities are necessary and where they should be located. Many MPOs already have effective freight planning methods and organizations in place that work closely with the private sector on freight matters. Examples are numerous, but include the Puget Sound Regional Council's (Seattle) Freight Mobility Roundtable, Chicago's Intermodal Advisory Task Force, and the Delaware Valley Regional Planning Commission's (Philadelphia) Freight Advisory Task Force. The units of government can effectively solicit input from the private sector as well as help the Federal government focus the national freight system concept's efforts.