

## **National Defense and the U.S. Interstate Highway Act of 1956**

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### **Abstract**

*The U.S. Interstate Highway System was created in 1944, but construction was stalled by disputes over funding and urban route locations. The 1956 Federal-Aid Highway Act resolved these issues. It also changed the name of the Interstate System to the National System of Interstate and Defense Highways. National defense figured prominently in lobbying and national defense continues to be cited by historians as a compelling justification for the Interstate System and for the greatly expanded federal role in highway construction. This paper critically evaluates the defense argument for the Interstate Highway System. It concludes that the defense argument does not stand up well to close scrutiny, and that if defense had indeed been a paramount concern, the Interstate Highway System would have had a very different configuration from the one enacted in 1956.*

**Keywords:** Interstate Highway Act; highway lobbying; highway legislation, U.S. highway history; national defense and highways

### **1.0 Introduction**

The federal system of government in the United States assigns the power to govern to three separate levels: federal, state, and local. Each level of government has its own activities, revenues, expenditures, and political constituencies. The federal government's powers and jurisdiction in this system are limited to powers and activities enumerated in the Constitution; all other powers and jurisdictions are supposed to be reserved for states and local governments.

This rather simple division has proven to be anything but simple in practice. Implied powers have been the subject of ongoing political debate and instances of abuse have been documented. For example, in the nineteenth century, federal troops were used to break rail strikes by deliberately attaching mail cars to trains; this manipulation effectively turned a labor dispute into a federal crime of interfering with the mail. This paper investigates whether national defense was a legitimate reason for extending federal power and jurisdiction in constructing the Interstate Highway System. Was national defense a strong case for the Interstate, or merely political manipulation?

This is not an exercise in second guessing from perfect hind-sight. Nor is it intended as a re-hash of a long-dead debate; defense as a rationale for building the Interstate is still a common historical assumption. In addition, the larger question of whether limitations on federal jurisdiction have been honored - or breached - remains an important political, historical, and economic concern.

### **1.1 The Federal Government and Highways**

Traditionally, building roads and highways had been the jurisdiction of state and local governments, especially city and county governments. Roads were not enumerated in the Constitution and the federal government was rarely involved in roads before the 20<sup>th</sup> century. In the early 20<sup>th</sup> century, the federal government created the Federal-Aid Highway System with the federal government picking up half of the cost of constructing a network of rural highways across the country (i.e., the federal-state funding ratio was set at 50-50).

The rationale for expanding federal jurisdiction into road construction was to fulfill its mandate to deliver the mail; in this case, to facilitate the delivery of mail in rural areas (i.e., Rural Free Delivery).

The quarter-million-mile Federal-Aid Highway System was essentially completed by the early 1930s. Following World War II, efforts were mounted in Congress to build a controlled-access (i.e., freeway) system. In 1944, the Interstate Highway System - the largest construction project in history - was officially enacted and its rural routes designated; however, the proposed urban routes were left undesignated. The Interstate Highway System was also left unfunded and while the federal funding rate was increased during the war to 75-25 in 1941, it reverted back to 50-50 in 1944. Until 1956, the Interstate Highway System remained unfunded and little more than a plan.

The reasons for the lack of construction are not hard to find – cost and financing. Disputes over routing and funding prevented any significant construction. The issues of routing and funding were, in fact, inseparable since the cost of the system clearly depended on the location of routes in and around urban areas. For example, in 1955, The President’s Advisory Committee on a National Highway Program (the Clay Committee) pegged the cost of a 40,000-mile Interstate System at \$27 billion (Clay, 1955). Of this, \$15 billion was allocated for the 6,200 miles of urban Interstate, and \$12 billion was allocated for the 33,800 rural miles. Thus, while the urban portion of the Interstate comprised only 15.5% of the system, it was responsible for 55.6% of the total cost. Urban highway construction costs have also been the primary reason for the numerous cost-overruns on the Interstate.

There was never much grass-roots support for the Interstate. For example, a public opinion poll in the early 1950s found that only 2 percent of respondents had even heard of the Interstate let alone form an opinion about it (St. Clair, 1986). Likewise, opponents of the Interstate System played virtually no role in lobbying. Instead, political disputes centered on conflicts over route locations and financing among Interstate backers. The final urban routes of the Interstate were designated in 1955 and a major legislative push for the system was mounted in the same year. However, even with the full backing of the Eisenhower Administration, the legislation was defeated. The strongest opposition came from truckers and fuel suppliers who, while in favor of a rural Interstate, opposed the cost and higher user taxes of an Interstate System that went through cities rather than around them (Leavitt, 1970; and St. Clair, 1986).

The 1955 defeat led the Eisenhower Administration to craft a revised bill in 1956 that addressed the concerns of opponents. The revised legislation was enacted in 1956 as the Federal Aid Highway Act of 1956. Key provisions of the 1956 Act included an initial \$27 billion in ongoing funding through 1972. Equally important, the federal-state funding formula was increased to 90-10 for the Interstate System.<sup>1</sup> The 1956 Act also changed its name from The Interstate Highway System to The National System of Interstate and Defense Highways.

The name change not only reflected the importance of national defense in establishing the Interstate System; it also highlighted national defense as the rationale for increasing federal funding. The 1956 Act also stipulated that the Interstate System was to be funded through user taxes levied on motor vehicle fuel, supplies (but not automobiles), and truck user fees.

However, to allay some of the concerns of truckers, the 1956 Act created a Highway Trust Fund into which user fees were deposited and reserved solely for highway use.<sup>2</sup> The creation of the Highway Trust Fund allowed truckers to grudgingly accept the costly urban routes that were included in the Interstate System. The 1956 Act thus overcame the political deadlock and allowed construction of the Interstate System to proceed. For its part, the Interstate System ushered in a profound restructuring of American transportation, cities, culture, and lifestyles.

## ***2.0 National Defense as an Argument for the Interstate System***

After World War II, highway experts and proponents of the Interstate System often stressed the defense aspects of the system and superlatives were the norm.

For example, in 1948, Dearing and Owen concluded that the Interstate System was of “greatest importance to national defense” (Dearing & Owen, 1949). U.S. Commissioner of Public Road, Thomas H. MacDonald used the same words in congressional testimony in 1948 (MacDonald, 1948). He also noted that the Interstate System had its genesis in the 1922 Pershing Map (a 78,000-mile map of strategic highways named for General John Pershing), confirming the military’s long-standing need for defense highways.

Congress received two reports specifically dealing with defense highway needs in 1941 and 1949 (Public Roads Administration, 1941; and Highway Defense Needs, 1949).

The 1949 Congressional report, *Highway Needs of the National Defense*, was the most thorough study of the defense highway shortcomings on the proposed Interstate routes; in essence, this report was a snapshot of the defense deficiencies that the Interstate would rectify. The report concluded that the Interstate was of “greatest strategic importance” and that defense needs warranted a “rapid improvement” of the Interstate (*Highway Defense Needs*, 1949).

The report also included a statement from the Secretary of Defense proclaiming that the Interstate was vital for national defense. In terms of specific defense highway deficiencies, *Highway Needs of the National Defense* concluded that only 6% (1,900 miles) of the 31,831 rural miles on the Interstate were adequate. Only 6.7% of the 5,969 urban miles in the system were adequate (*Highway Defense Needs*, 1949). Military representatives also appeared regularly before Congress and at various highway planning functions. Military representatives were present when President Eisenhower’s highway policies were presented at the Governor’s Conference at Bolton Landing in 1954. In 1955, Major General Paul Yount, the military’s point man in Congressional lobbying for the Interstate, testified extensively before Congress, stressing that the Interstate System was vital to national defense (Yount, 1955).

Eisenhower also appointed General Lucius Clay to chair the President’s Advisory Committee on a National Highway Policy in 1955. The Clay Committee introduced a new dimension to the defense argument by claiming that the Interstate was “vital” to a civil defense program capable of evacuating at least 70 million people in a nuclear attack (Clay Committee, 1955). In 1956, Jay Dugan wrote a very popular article that became an often-cited and well-circulated staple of the lobbying campaign for the Interstate (Dugan, 1956). Dugan analyzed the problems that a hypothetical armored division might encounter during an emergency deployment from Washington, DC to San Francisco if forced to deploy without the aid of the proposed Interstate System.

The choice of a Washington-to-San Francisco deployment was not random; this was the route taken by Lt. Col. Eisenhower when he served on the transcontinental army truck convoy in 1919 (see below). Dugan observed that the division’s 3,200 vehicles would stretch out single-file for 20 miles along the highway and that its progress might be slowed by “intersecting roads and private drive-ways,” by enemy attack, and by congestion from civilian refugees on the highway. Worse, the convoy might not even make it to San Francisco due to narrow roads, low overpasses, and weak bridges. Dugan also argued that, in the event of a nuclear attack, the Interstate would serve as the escape route for at least 70 million people.

While the 1956 Act was a milestone for the Interstate, it did not fully resolve all issues. By 1958, the projected cost of the Interstate had risen to \$41 billion (from the 1956 cost of \$27 billion), precipitating a crisis. With the higher cost and the Highway Trust Fund set to expire in 1972, completion of the Interstate construction was threatened (St. Clair, 1986). This development coincided with second thoughts and reservations about routing the Interstate through urban areas.

Eisenhower appointed General John S. Bragdon to report on the problem. Bragdon argued that the Interstate could be brought back on budget by eliminating about 1,700 miles of urban Interstate that traversed directly through cities. There were also indications that Eisenhower himself was having second thoughts about putting the Interstate through cities rather than around built-up urban areas (Schwartz, 1976). However, backers of urban radial routes used national defense as a compelling reason for keeping the Interstate as enacted in 1956. For example, a 1961 study commissioned by the automobile industry argued that the Interstate was “vital” to defense and that it was relatively invulnerable to attack (Smith & Associates, 1961). In a 1962 article in *National Defense Transportation Journal*, Paul F. Royster, Director of Operations at the Bureau of Public Roads, wrote that the Interstate System was even more important to national defense than it had been in 1956 (Royster, 1962).

Finally, the defense connection with the Interstate System invariably culminates in the person of Dwight Eisenhower. As a young army officer, Lt. Col. Eisenhower served as an observer on the Trans-Continental Motor Truck Convoy in 1919 (Eisenhower, 1919).

The 3,251 mile trip from Washington, DC to San Francisco entailed 81 army vehicles crossing the country to assess the army’s vehicles and the nation’s road. The convoy averaged six MPH and took sixty-two days. Beyond the Mississippi, paved roads were virtually non-existent and progress was very slow. In a 2006 article, David S. Pfeiffer summarized the impact of Eisenhower’s convoy and war experiences: “The convoy made a lasting impression on the young officer [Eisenhower] and stoked in him an interest in good roads that would last for decades.

A generation later, during World War II, Dwight D. Eisenhower was still thinking about good roads as Supreme Commander in Europe, where he oversaw the invasion of Western Europe and the defeat of the Nazi army, which was able to move quickly on the autobahns running through Germany. Later, as President of the United States, Eisenhower cited the 1919 convoy and his World War II experiences to persuade Congress to enact the Federal-Aid Highway Act of 1956, creating what is now known as the interstate highway system” (Pfeiffer, 2006).

## **2.1 The Unbelievers**

While skepticism about the role of defense in the Interstate debate is common, published criticisms have been rare. An early skeptic of the defense rationale for the Interstate System was the influential urban planner, Louis Mumford. In 1958, he called the defense argument “a specious guise” (Mumford, 1958). In a similar vein, Helen Levitt argued that the defense issue had been “simply a ‘sweetening’ device to gain support for the program back in 1956” (Levitt, 1970).

A more damning assessment was offered by former Maryland Congressman George Fallon. Fallon had been the key congressional supporter of the Interstate System and the congressional sponsor of the successful 1956 Act. In a 1974 interview, he was quoted as saying that the defense issue had only been “window dressing” (Schwartz, 1976).

While some skeptics expressed their reservations about the defense argument for the Interstate, none of them provided any supporting analysis or reasons. However, dismissing the defense argument without grounds seems just as irresponsible as uncritically embracing the defense argument.

## **2.2 The Task at Hand**

Was defense a vital reason for building the Interstate or merely political window dressing? Did the federal government rise to meet its defense obligations, or was a phony defense argument used to circumvent the letter or spirit of the Constitution? Many arguments were advanced in favor of the Interstate System during the lobbying campaign leading up to 1956 and a full discussion of this topic cannot be undertaken here.<sup>3</sup> Only the strength and validity of one argument – national defense – will be considered here. It should also be stated at the onset that the Interstate System obviously had defense dimensions; indeed, all infrastructure might conceivably play a role in defense (for better or worse) depending on the military scenario.

Arguing that the Interstate had no defense benefits is therefore an indefensible position. The real question is how much incremental defense benefit did the Interstate provide? Incremental in economics refers to the additional benefits received as a result of undertaking an activity. How much additional defense capability did the Interstate provide? Were the incremental defense benefits from constructing the Interstate large enough to make defense a primary reason for constructing it? Were the incremental defense benefits paramount in determining the design and structure of the Interstate System being proposed in 1956? Our ability to quantify the incremental defense benefits and costs of the Interstate may be limited by available historical data, but the incremental approach is very much at the heart of the analysis that follows.

## **3.0 The Purported Defense Benefits of the Interstate System**

Nine specific defense highway claims can be gleaned from the historical debate over the Interstate in the 1950s. It must be noted that most promoters of the Interstate usually claimed that national defense was important without ever offering any specifics at all. However, these nine specific claims have been compiled and analyzed in order to assess the Interstate’s incremental defense benefits.

### **3.1. Without the Interstate System, Emergency Military Deployments Would Result in Long Convoys Strung Out for Many Miles and Therefore Vulnerable to Delays by Enemy Harassment**

This scenario figured prominently in (Dugan, 1956) where he argued that an armored division deploying from Washington, D.C. to San Francisco would be strung out, single-file for twenty miles. This is probably true, but any incremental benefits from the Interstate would be very limited or largely irrelevant.

A wider road surface might have allowed for a double column that would have only stretched for 10 miles, but this seems to be a very small incremental benefit. As for the speed of the column, tactical considerations, such as enemy attack, convoy security, etc. would surely trump road conditions in determining how fast the division deployed - or even if the armored division would choose to use the Interstate.

Enemy harassment would always be a concern and would certainly slow military transport, but enemy harassment is not a function of road characteristics. In addition, enemy harassment might actually pose a bigger problem if military transport was concentrated on the Interstate System. For example, an enemy might be better able to anticipate that troops moving from Washington, DC to San Francisco would likely be found on I-80. These purported benefits from the Interstate are therefore limited or irrelevant.

### **3.2. Without the Interstate System, Emergency Military Deployment Would be Slowed or Stopped by a direct Atom Bomb Attack on a City along the Route**

It should not be surprising that fear of nuclear attack would figure prominently in all issues related to defense in the 1950s, highways included. From a modern perspective, this argument seems silly, even ridiculous - the Interstate System was no better prepared to withstand a direct nuclear attack than any other type of highway. An atomic attack would certainly impede military deployment, but the Interstate would not alleviate this.

However, dismissing this claim from a modern perspective will not suffice; the real historical issue is whether contemporaries were aware that the Interstate would have no impact on alleviating an atomic attack? It must be admitted that in the 1950s, the nature of nuclear war was not well appreciated - school duck-and-cover drills, home bomb shelters, and the government suggestion that men wear wide-brimmed hats in order to protect from the heat flash of an atomic bomb attest to this (Gerstall, 1950).

However, there is no evidence in any Congressional testimony or in Congressional reports supporting this defense claim. In addition, there is considerable testimony from military officials stressing the need for the Interstate to avoid built-up urban areas precisely because Interstate routes that traversed urban areas - rather than circumventing cities - were far more likely to be blocked by any attack, nuclear or conventional. This was an issue that the military was very interested in and they argued in favor of routes that by-passed congested urban areas. This put them at odds with radial-route proponents. We will return to this issue later.

### **3.3. Without the Interstate System, Emergency Military Deployment Would be hampered by Cross Traffic and Congestion**

Dugan claimed that a deploying armored division would be slowed along the proposed Interstate route by "intersecting roads and private driveways" (Dugan, 1956). In a similar vein, the 1949 Highway Needs of the National Defense noted that the Interstate would remove 760 railroad grade crossings and 9,864 stop signs and stop lights.

There is some merit in this claim, but its incremental magnitude is likely to be small or irrelevant. As a freeway system, the Interstate would eliminate much of the problem of cross traffic and people pulling out of their driveways. Freeways control access by limiting points of access to on-ramps, and they eliminate cross-traffic by restricting passage over the freeway to a limited number of overpasses. While both features tend to improve traffic flow, a few points about their relevancy to a military emergency are in order.

First, on-ramps adequately restrict access under normal circumstances, but access is not entirely denied, e.g., there are few impenetrable physical barriers restricting access. While it is illegal to enter a freeway except at access points, it is not impossible and it is unlikely that legal restrictions alone would suffice in the event of an emergency. A panicking population would not be deterred. Second, controlled-access highways are invariably controlled-egress highways as well. This can exacerbate congestion in the event of a blockage or emergency.

Congestion - whether from rush hour traffic or a defense emergency - tends to stifle traffic flow when access and egress are restricted. Consequently, while controlled-access/egress might improve military movement in principle, these features would probably worsen congestion as panicking civilians clogged the Interstate. Finally, while the benefits of removing grade crossings, stop signs, stop lights, and cross traffic were often trumpeted, there seems to have been very little appreciation about how this was to be accomplished; tens of thousands of overcrossings were to be constructed. Each of these overpasses created a potential cost of the Interstate in terms of restricted military mobility, i.e., every overpass created a potential vertical clearance impediment. We will return to this point later.

### **3.4. Without the Interstate, an Emergency Military Deployment would move slowly due to Seriously Inadequate Road Capacities**

The 1949 Highway Needs of the National Defense report claimed that about 55% of proposed Interstate routes were below minimum-width requirements, and that 15,115 curves were too sharp - of these, 3,199 were sharper than 14 degrees. In addition, Dugan claimed that a deploying armored division might never arrive in San Francisco if blocked by any of the 700 below-strength bridges on the proposed Interstate (out of a total of 12,600).

Likewise, Highway Needs of the National Defense found 677 bridges that were too weak, and another 31 that could not be rated. It is not hard to imagine how narrow roads, sharp turns, and weak bridges might impede military transport. But while one can easily imagine such adverse scenarios, the road adequacy criteria used in Highway Needs of the National Defense actually had little to do with the passage of military vehicles. Consequently, very little incremental defense benefit would accrue from Interstate upgrades. Road width, curve, and bridge requirements all illustrate this problem and will be considered in turn.

### 3.4.1 Road Width Requirements

Inadequate road width was the single biggest defense road deficiency noted in the *Highway Needs of the National Defense* report. To be adequate, a road required a minimum 22-foot width (i.e., two 11-foot lanes), with additional width required *where civilian traffic volume necessitated*. The report found that 55% of the inadequate rural roads on the Interstate were below the 22-foot minimum. Forty-five percent of roads were above the 22-foot minimum, but deemed to be inadequate only because civilian traffic needs dictated a greater width. Interstate road specifications required road dimensions that would accommodate the *civilian* traffic density of the thirtieth busiest hour in 1948 (Highway Defense Needs, 1949). While there is nothing wrong with building roads to higher civilian needs, this requirement was largely irrelevant to military transport.

Less than one per cent of rural Interstate roads on the proposed Interstate (only 241 miles, or 0.75%) were below 18 feet in width (Highway Defense Needs, 1949). However, there is no indication that roads with less than 18-foot widths would impede the passage of military vehicles because military vehicle specifications already required that general purpose military vehicles adhere to the same specifications as civilian vehicles, i.e., they were subject to an 8-foot width limit (Royster, 1962). Combat vehicles (e.g., tanks) were kept to a 12-foot width limit. Consequently, both general purpose and combat vehicles could traverse roads much narrower than 18 feet. In fact, the military required that its vehicles be designed to serve in Europe and Asia where road conditions would be far worse than in the United States.

There is no indication in the 1949 report as to how many miles of road were at or near a 12-foot width. However, the total could not have been more than a small fraction of a percent. The incremental defense benefits from widening Interstate roads were therefore rather insignificant.

### 3.4.2. Curve Requirements

Highway Needs of the National Defense found 15,115 curves on the proposed Interstate routes that were too sharp to meet specifications (Highway Defense Needs, 1949). Of these, 3,199 were found to be sharper than 14 degrees and therefore deemed to be woefully inadequate and capable of jeopardizing military defense. However, closer inspection of the criteria used in the report for determining the adequacy of curves suggests that there was little if any military benefit that would accrue from eliminating these curves because the adequacy of curves was based entirely on civilian vehicle speed requirements.

Interstate curve specifications were designed to accommodate “desirable” civilian traffic speeds of 70 MPH on flat sections of rural Interstate; 60 MPH in rolling terrain; and 50 MPH in mountains and in urban areas (Highway Defense Needs, 1949). Very sharp curves (e.g., greater than 14 degrees) might reduce mountain speeds to 40 MPH, while very sharp curves on flat rural portions of the Interstate might only reduce civilian speeds if they occurred too frequently. In any case, these curve requirements have virtually nothing to do with the passage of military vehicles and straighter roads could not increase military transport speeds because military vehicles were incapable of attaining these higher speeds.

For example, a Sherman tank - a staple in the U.S. army during of WWII - had a top speed of 25-30 mph.<sup>4</sup> A Sherman tank could therefore not move any faster with a straighter road. Likewise, tank transports would also not benefit. It was army policy to deploy tanks via tank carriers whenever possible. We do not know the speed of a loaded tank carrier in the 1950s, but modern tank carriers have top speeds of 38-45 mph.<sup>5</sup> Consequently, a tank being transported on a tank carrier, or being deployed under its own power, could not benefit from the high-speed design of the Interstate. The incremental defense benefits from road straightening were therefore miniscule.

### 3.4.3. Bridge Requirements

As noted, Highway Needs of the National Defense reported that, of the 12,048 bridges on the Interstate System, 677 were too weak (i.e., rated at below H-15-S-12 standard), and another 31 that could not be rated (Highway Defense Needs, 1949).

These 701 bridges amounted to about 5.8% of the total. However, most of these 677 deficient bridges would not have actually prevented military passage. Only 130 bridges were considered “dangerously inadequate” because of weight ratings below H-10 (Highway Defense Needs, 1949). If the 31 unrated bridges are added in, these 161 bridges – or only 1.3% of the total bridges - might have actually impeded strategic passage.

However, the military benefit from Interstate bridge upgrading is even more problematic than it first appears. All bridges on the Interstate were scheduled to be upgraded (and re-constructed) to a higher H-20-S-16 rating in order to accommodate civilian traffic volume. But the military’s weight limit for combat vehicles (i.e., tanks) was 80 tons, well in excess of the carrying capacity of H-20-S-16 bridges.<sup>6</sup> If a tank were to reach this weight limit, it would exceed the rated carrying capacity of all Interstate bridges, even after upgrading. Interstate specifications would therefore not address the movement of these vehicles at all. However, it was also generally agreed that heavy tanks could be moved safely across H-20 and H-15 bridges (and even H-10 bridges) if done so on an infrequent basis, and if properly loaded on a tank transporter that redistributed the weight. This tank transporter requirement effectively reduced the incremental defense benefits from upgrading Interstate bridges.

### **3.5. Without the Interstate System, an Emergency Military Deployment Might be blocked by Restricted Vertical or Horizontal Clearances on Overpasses, Roads, or Bridges**

Dugan claimed that a deploying armored division might not arrive at its destination if blocked by any of the 100 overpasses, roads, or bridges with restricted vertical or horizontal clearances. Likewise, Highway Needs for the National Defense found 320 instances where a 14-foot vertical clearance was not available. Compared to other deficiencies, vertical clearance problems on the proposed Interstate were not as prevalent because there were, as yet, so few overpasses and tunnels. Consequently, the system was still beset by cross streets, stop signs, and stop lights. The benefit of a 14-foot vertical clearance therefore stemmed from having a uniform specification applicable to the thousands of future Interstate overpasses. However, there are reasons for believing that the incremental defense benefits from this standard were quite limited, and might also pose a possible serious problem.

First, the incremental defense benefit from having a minimum vertical clearance requirement on the Interstate was limited by the military's policy on vehicle design specifications. Starting in 1935, military vehicles were designed to meet general American road specifications, with exceptions granted for over-riding military necessity. After World War II, this policy was modified; henceforth, American military vehicles were to be designed for use on more restricted European and Asian roads. Regarding height, military policy required that vehicles be designed for 11-foot clearances. Overriding military need could increase the height limit to twelve and one-half feet. This restriction reduced the incremental benefit derived from a 14-foot standard. It should be noted that if military designers had taken advantage of the higher clearances on the Interstate, it would come at the cost of limiting their use on foreign roads and on American roads off of the Interstate.

Second, as noted above, the military’s weight limit for combat vehicles was 80 tons, well in excess of H-20-S16 bridge capacity. Tanks crossing these bridges would require a tank carrier. However, putting a tank with a 12.5-foot high tank on a carrier would easily exceed the 14-foot height clearance. Consequently, every overpass constructed on the Interstate could become a barrier to an armored column. Dugan’s deploying armored division would, in fact, have faced greater obstacles if it deployed on the Interstate. This potential cost of restricting military movement on the Interstate due to overpasses was therefore rather significant.

### **3.6. Without the Interstate System, an Emergency Military Deployment Might be blocked by Road Damage Suffered in an Attack and Civilian Refugees Clogging the Roads and Making Them Impassable**

The possibility of clogged roads delaying or denying the passage of military vehicles was certainly a real concern. Highways are notoriously inefficient at dealing with peak-load demand and a military emergency would certainly create a peak-load problem.<sup>7</sup> While there is no highway design that can overcome this problem, route location is an important consideration. The problem of roads clogged by refugees and damage from enemy attack was most problematic in built-up urban areas.

The military was very much aware of this problem and took the position that the Interstate System had to be properly situated vis-à-vis cities. Specifically, the Interstate should avoid going through cities.

For example, General Yount testified before Congress in 1955: “The area in which we have done the most consultation with the Bureau of Public Roads has been on the problem of circumferential routes around cities. ... It is certainly a matter of great concern to the Bureau and the [Defense] Department, because with the possibility of blocking of the radial spoke type of urban highway which we currently have, we should have the circumferential routes as an alternative” (Royster, 1962).

In 1960, when cost overrides once again brought the urban radial routes into question, the Army’s Assistant Chief of Transportation Engineering testified: “For some time, the Department of Defense has felt that highways would be of greatest potential value in urban areas if they were circumferential in character. We are not talking about circles, but we are talking about roads that go around the highly developed urban areas, with their tall buildings and congestion ... rather than a plunge route that goes through the center of the city. I think it is rather obvious ... that there is more potential in the use of the highway if it is in suburban areas where buildings are lower, and it could be cleared ... than if it is downtown and it is not available” (Chacey, 1960).

It should be noted that the military was basically arguing in favor of an Autobahn-type system, i.e., a highway system connecting cities rather than traversing them. However, this put the military at odds with automobile industry interests that sought an Interstate that slashed directly through cities. On this important radial vs. circumferential route issue, the military lost the lobbying battle.

### **3.7. The Interstate Would Help Evacuate at Least 70 Million People from Cities in the Event of an Enemy Attack**

The civil defense argument stems from a single paragraph in the Clay Committee Report: “From the standpoint of civil defense, the capacity of the interstate highways to transport urban populations in an emergency is of utmost importance. Large scale evacuations of cities would be needed in the event of an A-bomb or H-bomb attack. The Federal Civil Defense Administrator has said the withdrawal task is the biggest problem ever faced in the world. It has been determined as a matter of Federal policy that at least 70 million people would have to be evacuated from target areas in case of threatened or actual enemy attack. No urban area in the country today has highway facilities equal to the task. The rapid improvement of the complete 40,000-mile interstate system, including the necessary urban connections thereto, is therefore vital to ... civil defense...” (Clay Committee, 1955).

While the report clearly identifies the Interstate System as the solution to the “biggest problem ever faced in the world,” General Clay, in testimony before Congress on the committee report, distanced himself from the civil defense claim when he testified that he “certainly would not want to be an advocate that you could possibly protect the people of the United States with any program of mass evacuation” (Clay Testimony, 1955).

It is hard to find any credence in the civil defense argument for the Interstate, but historical context does need to be considered. In the 1950s, civil defense officials anticipated that they would have from 2 to 7 hours advance warning of an enemy nuclear attack (this shrunk to less than a half hour as the age of guided missiles dawned). But even allowing for these long lead times, the task seems entirely unrealistic. Equally important, it seems inconceivable that any highway system could ever affect such an evacuation; this would be the peak-load problem of all time, and highways simply do not have good peak-load carrying capacity.

On balance, one must conclude that General Clay’s abrupt about-face on the issue was an entirely warranted retreat. The real value of the civil defense claim seems to have been as a lobbying argument in favor of urban radial routes over circumferential routes since spoke routes seemed more like direct evacuation routes.

### **3.8. The U.S. Experience with Transport during World War II and our Encounter with the German Autobahn demonstrated a Pressing Need for the Interstate**

According to a 1977 Department of Transportation study looking at transport during World War II, “the mobilization of 1940-41 had shown in a startling way how dependent the United States had become on its highways for its existence” (DOT, 1977). Likewise, Highway Needs of the National Defense praised the contribution of highways to WWII war production by noting that war plants received about 65 percent of their incoming freight by truck, and that 69 per cent of outbound freight left by truck (Highway Defense Needs, 1949). The report concluded that highways had become an integral part of war production.

While highways and trucks did contribute to the war effort, the story of war transport during the Second World War is overwhelmingly a railroad story. The U.S. relied on railroads, not highways, for the bulk of its war transportation. Railroads handled more than 90 percent of all military freight and more than 97 percent of organized military passenger traffic during World War II (War Department, 1945).

The railroads increased their intercity ton-miles carried during the war from 379 billion in 1940 to a war-time peak of 735 billion ton-miles in 1943. Trucks handled 10 percent of the ton-miles in 1940, but their share fell sharply to 5.6 percent in 1943. By 1944, truck travel had fallen to 71 percent of its 1941 level. Railroads handled the lion's share of war transportation because of their superior peak-load capacity. More importantly, post-war studies of future defense transportation needs concluded that railroads would continue to be the backbone of defense transportation (Revision of Transport Policy, 1955).

During World War II, highway construction and maintenance were all but halted as highways became "expendable" (Highway Defense Needs, 1949). Only three types of road construction received adequate funding and rationing priority during the war: 1) the Alaskan Highway through Canada to Alaska; 2) the Trans-Isthmus Panamanian Highway at the Panama Canal; and 3) military access roads.<sup>8</sup> It is important to note that none of these high-priority highway projects were ever part of the Interstate.

A similar question arises regarding the German Autobahn: Did the American military come to appreciate the Interstate after seeing the contribution of the Autobahn to the German war effort? Two considerations suggest that this was not the case. First, there does not seem to be a single instance where the Autobahn was ever a major strategic or tactical factor during the war, or where it had been a high-value bombing target. Second, the Autobahn differed significantly from the Interstate System; the Autobahn connected German cities, but did not go through them. The rural Interstate was indeed comparable to Autobahn, but the urban-oriented Interstate was very different. At great expense, the Interstate was designed to go through American cities, a point that casual references to the Autobahn-as-precursor-to-the-Interstate never seem to appreciate. If the Autobahn had indeed been of great importance to the German war effort, then one might have expected that this would have supported the version of the Interstate advocated by the U.S. military, i.e., an Interstate that essentially by-passed built-up urban areas. However, this was a lobbying battle that the military lost.

### **3.9. The Interstate System was the Natural Extension of Defense Highway Needs First Embodied in the 1922 Pershing Map**

Chronologically, the Pershing Map is indeed an antecedent to the Interstate, but that is where any meaningful connection ends. First, the Pershing Map was not a freeway system like the Interstate; it was actually a map of proposed grid of paved roads. There is no doubt that paved highways – as opposed to unimproved dirt roads - dramatically enhance defense mobility. It is also true that the U.S. highway system following World War I was woefully inadequate because it lacked of paved roads.

For example, Eisenhower's final report on the 1919 transcontinental army truck convoy concluded that, while roads in the eastern part of the country were generally adequate, roads west of the Mississippi were virtually non-existent (Eisenhower, 1919). Second, the Pershing Map identified an **extensive** grid of 78,000 miles of paved roads that would blanket the country. In contrast, the Interstate was a much smaller network of controlled-access highways that intensified and concentrated traffic. The Pershing Map did not include overpasses and controlled access, both of which might have actually reduced tactical military mobility on the Interstate. Finally, there is no significance in the fact that the Pershing Map contained just about all of the rural miles of the Interstate System - how could a 78,000 mile highway grid not contain most of the 36,000 miles of rural Interstate?

### **4.0 Conclusions**

Does any of this really matter? Does it make any difference whether defense really mattered in the decision to build the Interstate? In his discussion of the historical origins of the game of baseball, Donald Honig encountered a similar issue: "This is what we have been told: Abner Doubleday invented baseball in Cooperstown, New York in 1839. It's an amiable myth – no one believes it, nor does anyone attack it with fervor, for this is a myth that sounds and feels right and feels comfortable nestling among the lighter harvests of the imagination. ... And if Cooperstown was not the cradle of baseball, well, then it looks like it should have been..." despite the fact that Abner Doubleday "didn't know a baseball from a kumquat." (Honig, 1990).

Is the defense argument for the Interstate yet another example of a comforting myth masquerading as fact? Whether one is or is not comfortable with the mythological roots of baseball, this approach seems far from satisfactory when applied to the origins of the Interstate Highway System. While an uncritical first glance at the defense attributes of the Interstate seem obvious and compelling, closer examination of these purported benefits reveals fundamental flaws and weaknesses in the defense argument. The incremental defense benefits were usually quite small or irrelevant.

In addition, the Interstate incurred defense highway costs, especially with the Interstate urban radial routes. Finally, if the Interstate had indeed been vital to national defense, it would have looked more like the autobahn and it would have avoided going through cities.

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## Footnotes

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<sup>1</sup> A 50-50 federal-state funding ratio was established in 1921. The funding was raised to 75-25 in 1941, but reverted to 50-50 in 1944. The ratio was changed to 60-40 in 1954 with an eye towards funding the Interstate System, but this proved inadequate in view of Interstate System funding requirements. The 90-10 ratio enacted in 1956 allowed for a 95-5 ratio in some western states.

<sup>2</sup> The diversion or “raiding” of highway user fees by governments for general expenditures had been a controversial practice, especially in the revenue-strapped environment of the depression. The Highway Trust Fund addressed the specific concerns Internet System of truckers as well as the general practice of diversion.

<sup>3</sup> For a fuller description of lobbying activities, and especially the interests of different parties in the winning coalition, see: (St. Clair, 1984); (St. Clair, 1986); and (Rose, 1975).

<sup>4</sup> This is comparable to other tanks. For example, the German Panther tank during WWII had a top speed of 29-34 mph; the WWII German Panzer IV tank had a top speed of 26 mph on road, and a top speed of 9.9 mph off-road. The current M1 Abrams tank (M1A2) has a top speed of 35 mph on-road, and 25 mph off-road.

<sup>5</sup> Tank carriers, or Heavy Equipment Transporters (HETs), are large vehicles used to transport, deploy, and evacuate tanks, armored personnel carriers, self-propelled artillery, and other heavy military vehicles. HETs save wear and tear on the tanks, and are more cost efficient; tanks are expensive to run and to maintain. By not having to self-deploy tanks to the battlefield, breakdowns are prevented and more combat-ready vehicles are available for combat. Modern HETs can attain top speeds of about 38-45 MPH.

<sup>6</sup> Tanks have generally not reached this weight limit; the current M1 Abrams tank weighs about 67.6 tons. During WWII, the Sherman tank weighed 30.3 tons while the German Panther tank weighed about 49.4 tons. The fact that tanks have not exceeded this weight limit to date does not negate the point about the difficulty posed by vehicles exceeding the carrying capacities of Interstate bridges even after upgrading.

<sup>7</sup> During the invasion of France in 1940, advancing German troops made tactical use of this problem by driving civilian refugees onto roads, denying the French the use of their own roads.

<sup>8</sup> Military access roads provided access to military establishments, or were roads located entirely on military bases. They were the roads most urgently needed at the outbreak of war, and our highway policy during the war emphasized their construction. In late 1941, \$150 million was allocated for military access roads. Another \$100 million was allocated for access roads in 1942 and a further \$25 million in 1944. The entire 74,600- miles "Strategic Network" received only \$50 million in 1944. The importance of access roads can also be seen in their priority classification (required of all construction projects by the Office of Defense Mobilization). Access roads to military installations and defense plants received the highest priority, A-1. Bridges, tunnels, and road construction projects on primary highways rated an A-2 priority. However, an A-7 priority was accorded these same projects on secondary routes. By April 1942, it took a priority of A-3, or higher, to get steel. Construction projects required an A-1 priority in order to get most construction equipment. It is not surprising that road conditions deteriorated dramatically during the war. See: (DOT, 1977) pp. 144-47.