EXECUTIVE SUMMARY

FAILURE TO ACT

THE ECONOMIC IMPACT OF CURRENT INVESTMENT TRENDS IN AIRPORTS, INLAND WATERWAYS, AND MARINE PORTS INFRASTRUCTURE ★★★★★

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Air and waterborne transportation infrastructure spans the United States and the globe. These facilities are critical to the health of the U.S. economy, enabling the importing and exporting of goods, as well as global business travel:

★ The U.S. aviation system includes almost 20,000 civilian airports, although just 5,200 are open to the public. Of these, more than 3,300 are designated by the Federal Aviation Administration (FAA) as part of the National Plan of Integrated Airport Systems, including all 500 commercial service airports and 2,800 general aviation airports. Both air passenger and air freight services are concentrated in a relatively small number of airports in major metropolitan areas. Roughly 80% of U.S. origin and destination traffic is in 15 metropolitan markets, and 70% of air freight tonnage originates at 15 metropolitan areas (nine metropolitan areas are included among the top 15 passenger and freight markets).

★ The U.S. inland port system consists of more than 12,000 miles of inland and intracoastal waterways, with about 240 lock chambers. More than 566 million tons move through the inland transportation system annually, more than half of which is coal and petroleum products. More than 70 million metric tons of grain, soybeans, and food are transported within the U.S. each year by way of the inland transportation system.

★ The U.S. has more than 300 commercial marine ports, through which pass 2.3 billion short tons of cargo a year, and more than 600 smaller harbors. In 2010, 51% of the potential capacity of container yards in U.S. ports was fully utilized. The system accommodated more than 16,800 annual vessel arrivals.

Airports and ports cannot function without effective connections to the nation’s roads and rail systems. Virtually all cargo shipped by air arrives at and departs from airports by truck. Passenger transportation to and from airports is primarily by car, but also includes an increasing proportion of transit options (e.g., fixed rail and buses). Inland and marine ports rely on highways and railroads to transport cargo to ports for shipment and to distribute goods to market.

The Role of Airports, Inland Waterways and Marine Ports in the U.S. Economy

Airport services facilitate the transfer of passengers and goods and function as gateways to economic globalization. Passenger and freight movements are concentrated in a handful of the thousands of airports in the national aviation system. Among the 3,300 airports that are designated by the FAA as important to the national aviation system, 35 airports in the nation’s top 15 markets account for 80% of U.S. domestic passenger origin and destination movements, totaling 343 million trips. The FAA forecasts that enplanements in these 15 markets will increase 30% by 2020 and 121% by 2040. These projections exceed enplanement forecasts at other commercial airports, which are predicted to increase 25% by 2020 and 93% by 2040. More important from the perspective of air traffic projections, commercial aircraft operations are projected to grow 17% through 2020 and 62% by 2040, including increases in the 15 major markets of 23% by 2020 and 86% by 2040.

As with passenger travel, freight shipments are concentrated in major metropolitan areas. By tonnage, 92% of international air freight tonnage is imported or exported through the 15 leading U.S. customs districts, and 70% of domestic air tonnage originates in 15 key metro markets.
(nine metro areas are among the top 15 for both air passenger and freight markets).

In the United States, the system of inland waterways and marine ports play a vital role in both the domestic and international transportation systems. In 2010, the cargo transported on these waterways was valued at $152 billion. For the inland waterway system, this includes approximately 56% of all crude petroleum, 15% of all coal, and 24% of other fuel oils, which alone affect the efficiency of all economic sectors that rely on energy. Other commodities with significant shares moving by water include 22% of basic chemicals, 18% of agricultural products, and 19% of nonmetallic minerals.

By 2020, traffic on inland waterways is expected to increase by 51 million tons of freight from 2012, an overall 11% increase. By 2040, this increase is expected to exceed 118 million tons above 2012 levels, an overall increase of 25 percent.

The marine ports system is especially important for America’s international trade, with nearly 800 million tons (70% of U.S. imports in 2010), valued at more than $944 billion (approximately 50% of all imports by value), arriving in the U.S. by water (see Table 1). These imports included 86% of America’s crude petroleum imports as well as the majority of 28 other commodities imported to the U.S. The U.S. depends heavily on waterborne trade for its growing export markets, especially agricultural products, manufactured goods, and, increasingly, the exporting of energy and refined petroleum products. In 2010, more than 76% of U.S. exports (by tonnage), valued at $469 billion (approximately 35% of total exports by value), were transported by water for foreign markets.5

Trade volume for marine ports is expected to double by 2021, and double again shortly after 2030. Even if global growth slows due to economic problems in Europe, our major trading partners are a diverse set of countries in Asia and Latin America, and the growth forecasts are indicative of long term trends that will require major investments in our marine ports.6

The Investment Gap
Airports

For commercial airports, the Airports Council International-North America (ACI-NA) and the FAA publish projections of five-year spending needs, and the FAA tracks both private and public actual expenditures in its Form 127 reports.7

<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>U.S. Waterborne Freight through Marine Ports—Imports and Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>TONNAGE (MILLIONS)</td>
<td>VALUE (TRILLIONS OF 2010 DOLLARS)</td>
</tr>
<tr>
<td>Imports</td>
<td>798</td>
</tr>
<tr>
<td><strong>Percent of total imports</strong></td>
<td>68.8</td>
</tr>
<tr>
<td>Exports</td>
<td>580</td>
</tr>
<tr>
<td><strong>Percent of total exports</strong></td>
<td>76.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,378</td>
</tr>
<tr>
<td><strong>Percent of total trade</strong></td>
<td>71.9</td>
</tr>
</tbody>
</table>

Extending the trends of needs and spending from these sources shows an annual capital gap of about $2 billion through 2020 (roughly $13 billion in need and $11 billion in expenditures per year) and $1 billion annually from 2021 to 2040 ($12 billion in need to $11 billion in expenditures, assuming spending through 2020 does not fall lower than recent trends).

In addition to construction needs, congestion relief is being proposed through the Next Generation Air Transportation System (NextGen), which is expected to transform the management and operation of the air transportation system in the United States, moving from the current ground-based radar system to a satellite-based system. NextGen is designed to minimize delays by reducing the time aircraft sit on the ground. Multiple uncertainties may affect the timing and ultimate costs of NextGen, including constantly changing technologies. At present, the most widely accepted projected cost for NextGen is $31 billion, in addition to the approximately $9 billion that has already been invested between 2003 and 2011.8

Inland Waterways and Marine Ports
The greatest threats to the performance of the inland waterway system are the scheduled and unscheduled delays caused by insufficient funding for operation and maintenance needs of locks governing the traffic flow on the nation’s inland system. A total of 90% of locks and dams on the U.S. inland waterway system experienced some type of unscheduled delay in 2009. According to the U.S. Army Corps of Engineers, maintaining existing levels of unscheduled delays on inland waterways, and not further exacerbating delays, will require almost $13 billion in cumulative investment needs by 2020, and an additional $28 billion by 2040. Current funding levels can support only $7 billion by 2020, and an additional $16 billion by 2040. Roughly 27% of these needs entail the construction of new lock and dam facilities, and 73% are estimated for the rehabilitation of current facilities.

In many cases, private and public investment by port authorities and non-port entities enables the ports simply to maintain existing conditions to fulfill customer needs and requirements. However, many commercial ports are also planning improvements. Port authorities are planning on spending a combined $18 billion through 2016 on infrastructure improvements for water terminals, while their private-sector terminal partners anticipate spending a combined $27.6 billion for a total of nearly $46 billion. This is more than $9 billion per year, of which more than one-third would be spending by the port authorities themselves. Although this investment would make up the majority of funding for ports, the maintenance of existing navigable channels and waterways and the ability to accommodate the increasing size of cargo vessels requires dredging, a portion of which must be funded by the public sector through Congressional appropriations to the U.S. Army Corps of Engineers. A key challenge for marine ports in the United States, particularly on the East Coast, will be their ability to handle the large “new-Panamax” cargo ships that will start service with planned expansions of the Panama and Suez Canals.

To accommodate anticipated growth in trade and domestic waterborne traffic, total public investment needs are expected to exceed $30 billion by 2020. This includes both navigational dredging and operation and maintenance needs for both marine dredging and inland waterways and marine ports. It does not include private sector investments to improve the port facilities themselves or improving connections to surrounding roads and rail systems to reduce congestion experienced by trucks entering and exiting port facilities. By 2040, these needs are expected to reach $92 billion.10 The U.S. will be left with a funding gap of nearly $46 billion if current investment trends continue, based on the annual budgets for navigational purposes.
that have historically been appropriated to the U.S. Army Corps of Engineers by Congress.\textsuperscript{11} About $16 billion of the funding gap is expected to accumulate by 2020, with the additional $30 billion projected to accumulate from 2021 to 2040.\textsuperscript{12} More than 61% of the identified need and funding gap are intended for marine navigation and operations and maintenance, and about 39% for inland waterways.\textsuperscript{13}

\section*{Economic Impacts}

The U.S. economy relies on low transportation costs for its exports to offset higher wage levels and costs of production when compared with its competitors. Greater costs to export goods will affect the nation’s ability to compete in global markets for goods produced in the U.S. Although this is already happening in a limited number of industrial sectors today, these effects could magnify in the future. If current needs and investment trends for U.S. airports, inland waterways, and marine ports continue over time, the nation’s competitiveness will erode, affecting its ability to sustain well-paying jobs, especially in export sectors. In addition higher costs will be incurred for imports, which will increase costs of materials to businesses, thereby increasing cost of production, and for consumer products sold to households, which eventually will erode their disposable income. These effects are reflected in significantly lower projected levels of U.S. exports, business sales, GDP and disposable personal income throughout the economy, culminating in a loss of jobs. Table 2 summarizes

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|c|c|}
\hline
\textbf{ANNUAL IMPACTS} & \multicolumn{2}{c|}{\textbf{AIRPORTS}} & \multicolumn{2}{c|}{\textbf{INLAND WATERWAYS AND MARINE PORTS}} \\
\hline
 & 2020 & 2040 & 2020 & 2040 \\
\hline
\textbf{GDP} & $-47$ & $-70$ & $-95$ & $-255$ \\
\hline
\textbf{Jobs} & -350,000 & -358,000 & -738,000 & -1,384,000 \\
\hline
\textbf{Business Sales} & $-87$ & $-179$ & $-183$ & $-517$ \\
\hline
\textbf{Disposable Personal Income} & $-53$ & $-53$ & $-117$ & $-269$ \\
\hline
\textbf{Exports} & $-11$ & $-62$ & $-43$ & $-142$ \\
\hline
\hline
\textbf{CUMULATIVE LOSSES} & \multicolumn{2}{c|}{2012–2020} & \multicolumn{2}{c|}{2021–2040} \\
\hline
\textbf{GDP} & $-313$ & $-1.21$ trillion & $-697$ & $-3.3$ trillion \\
\hline
\textbf{Business Sales} & $-580$ & $-2.7$ trillion & $-1.3$ trillion & $-6.5$ trillion \\
\hline
\textbf{Disposable Personal Income} & $-361$ & $-1.1$ trillion & $-872$ & $-3.7$ trillion \\
\hline
\textbf{Exports} & $-54$ & $-708$ & $-270$ & $-1.7$ trillion \\
\hline
\end{tabular}
\caption{Effects of Failure to Invest in Airports, Inland Waterways, and Marine Ports, 2012–2040 (in billions of 2010 dollars, unless otherwise indicated)}
\end{table}

\textbf{NOTE:} Losses in business sales and GDP reflect impacts in a given year against total national business sales and GDP in that year. These measures do not indicate declines from 2010 levels.

\textbf{SOURCES:} EDR Group and LIFT model, University of Maryland, INFORUM Group, 2012.
the economic impacts for 2020 and 2040, and the cumulative impacts expected during the periods 2012–20 and 2021–40. Total impacts through 2020 and 2040 are discussed below.

Airports
The economic impact of congestion at major airports will have significant effects on the national economy due to delays in cargo movement and business travel, assuming that capital spending remains consistent through 2040, as it has been since 2001 (about $10 billion annually in 2010 dollars). The broad impacts on the U.S. economy would represent cumulative losses from the national economy of $54 billion in export value and $580 billion in overall business sales by 2020, rising to $762 billion and $3.3 trillion by 2040; lower levels of gross domestic product (GDP) are expected to amount to $313 billion by 2020 and $1.21 trillion by 2040; and losses in disposable personal income will total $361 billion by 2020 and $1.49 trillion by 2040 (all in 2010). Overall, the U.S. economy will end up with 350,000 fewer jobs than it otherwise would have by 2020.

Over time, domestic freight movement and business travel will likely shift from relying on air to surface transportation modes to partially adjust for the declining efficiencies and higher costs of air transportation.14 However, this will lead to higher costs for those commodities that are shipped by air, both in terms of out-of-pocket expenses and time,15 which will mean particularly hard times for all industries that require same-day freight delivery. As a consequence of congestion, the direct cost of air transportation is projected to be 6% higher in 2020 and 9% higher in 2040 than would be the case with the initial investment.16

Inland Waterways and Marine Ports
Similar effects are felt within the inland waterways and marine ports sectors. If America only maintains its current level of investment in these systems, the losses to its economy will increase shipping costs annually. By 2020, lost value of exports will be $270 billion and will rise to almost $2 trillion by 2040. Roughly $1.3 trillion in business sales will be lost by 2020, rising to $7.8 trillion by 2040. The cumulative loss in national GDP will be about $700 billion by 2020 and reach $4 trillion by 2040. Disposable personal income will be lost, with losses projected at almost $872 billion through 2020 and $4.5 trillion through 2040. With this reduction in production, income, and spending, there are projected to be 738,000 fewer jobs in 2020. By 2040, the job losses will grow to almost 1.4 million—jobs that will be lost due to the lack of U.S. competitiveness in global trade and because the nation’s households and businesses will be spending more for commodities that arrive by marine ports and are transported to market via inland waterways.

Conclusion
America’s airports, inland waterways, and marine ports link the nation directly to the global economy, and link regions of the United States together. These three infrastructure systems support the nation’s ability to export, to efficiently move goods internally and to expand our high-end service sector through widespread business travel. These functions are critical to the U.S. economy, and depend on the efficient and cost effective operation of these networks. Each of these systems require that the investments needed to sustain competitive transportation costs are well coordinated among the many interdependent modes of transportation needed to keep the entire U.S. supply chain operating efficiently, and to ensure that our strong service sectors can efficiently and cost-effectively make use of international and long-distance business travel. However, as has been demonstrated in this report, inadequate and unbalanced investments in essential commercial transportation infrastructure have become an enormous drag on the productivity and competitiveness of the U.S. economy.

2. Both the 2007 U.S. Commodity Flow Survey and the 2010 (provisional) Freight Analysis Framework link air freight to truck, and do not mention rail in the context of air cargo.

3. See Mathew Coogan et al., Ground Access to Major Airports by Public Transportation, ACRP Report 4, Airport Cooperative Research Program of the Transportation Research Board.

4. An “enplanement” is a passenger boarding. The FAA uses revenue passenger boardings (enplanements) and cargo data to calculate the apportionments that determine apportionment formula for the Airport Improvement Program.


7. As reported by airports to the FAA on Form 127, these expenditures represent revenues drawn from all sources—including federal, state, and local governments, passenger facility charges, airport revenues, and capital bonds. Although ASCE and FAA project needs for all airports, Form 127 accounts for spending only for commercial airports. Accordingly, needs and expenditures cited in this paragraph reflect commercial airports only, and do not include reliever and other general aviation airports.

8. US Government Accountability Office, Air Traffic Control Modernization Management Challenges Associated With Program Costs and Schedules Could Hinder NextGen Implementation, Report to Congressional Committees, February 2012. According to an alternate analysis, implementing the highest performance levels envisioned in the IWP for ground and aircraft capabilities by 2025 could increase NextGen’s costs significantly beyond the initial cost estimate of $40 billion (e.g., in some scenarios that require every aircraft to be equipped with extensive avionics in a shorter time frame, estimated costs can go as high as $160 billion). If the highest performance levels are implemented over the longer period, by 2035, the cost estimates would be lower, but still would be considerably higher than $40 billion.” Gerald H. Dillingham, Ph.D., Director of Physical Infrastructure Issues, US Government Accountability Office, letter to The Honorable John L. Mica and The Honorable Thomas E. Petri, November 22, 2010, Subject: Integration of Current Implementation Efforts with Long-term Planning for the Next Generation Air Transportation System.


10. The $92 billion is projected over 30 years. This is based on average annual needs estimated by the US Corps of Engineers assuming that a state-of-good repair is maintained for the existing system. Given that substantial additional navigational dredging will be required, and that this will increase on-going operations and maintenance requirements, these estimates are very likely to be lower than required to maintain future improvements to the marine navigation system.


12. The projections are based on the Corps’ estimates of annual additional needs from 2011 to 2020.


14. This is assuming that the other modes are viable alternatives, and not functioning below “minimal tolerable conditions.”

15. Examples including rushing parts to repair broken (and therefore idle) equipment, incurring hourly crew costs over long distances, spoilage/breakage/insurance and packaging costs due to moving fragile goods (or expensive drugs) overland.

16. This cost increase is in real value after inflation. Source: LIFT model, University of Maryland, INFORUM Group, 2012.