

**Role of Technology in  
Enhancing  
Competitiveness and  
Reliability in the Marine  
Sector**

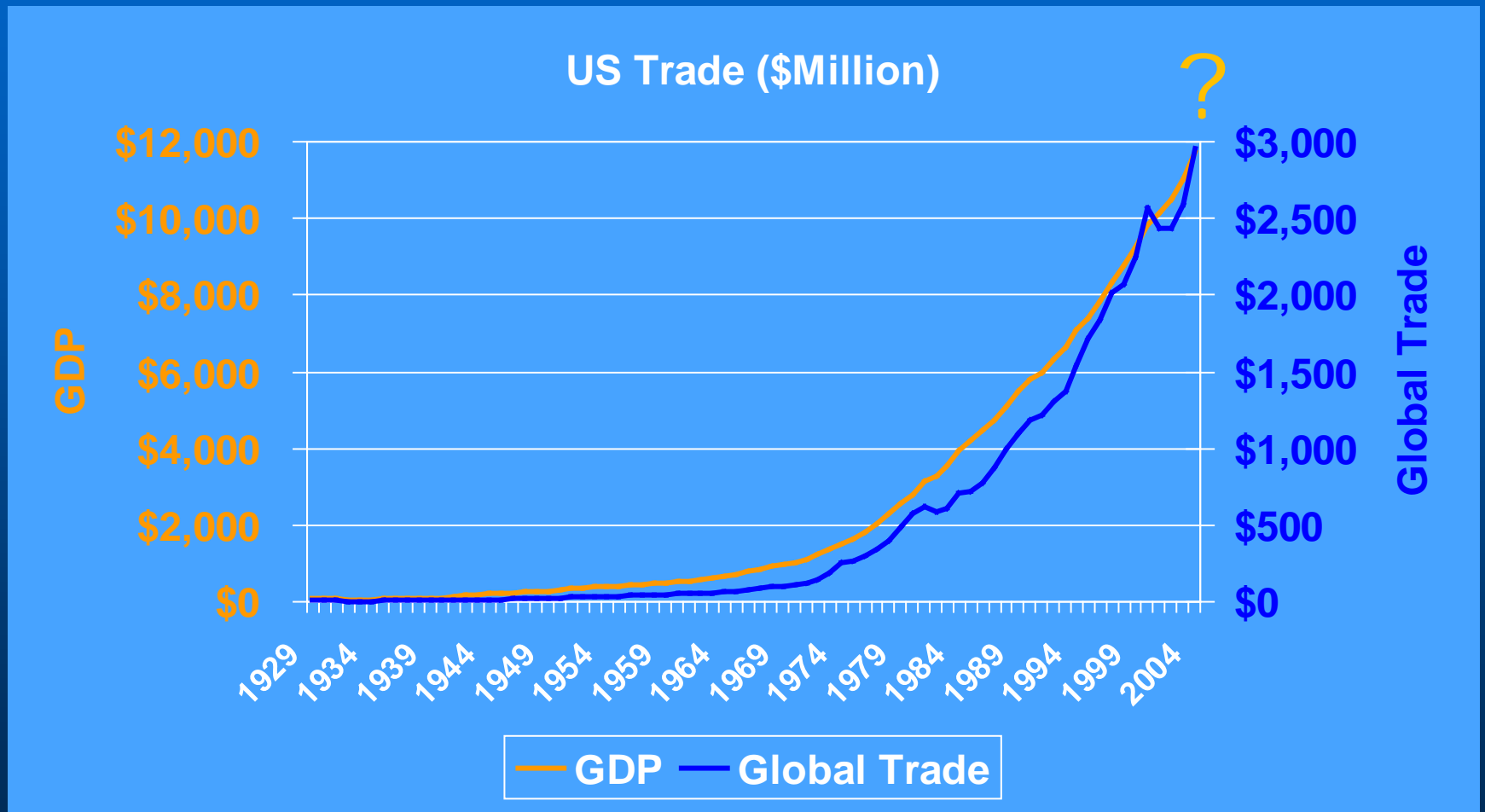
**Tools, Trends,  
and the Global Perspective**

Major General Walsh  
questioned defined it:

Value to the Nation

**"Economic Security"**

# U.S. GDP Correlated to Trade



Source: Global Insight

# Mid-90s “Listening Sessions” Found US Policy Approaches Inadequate

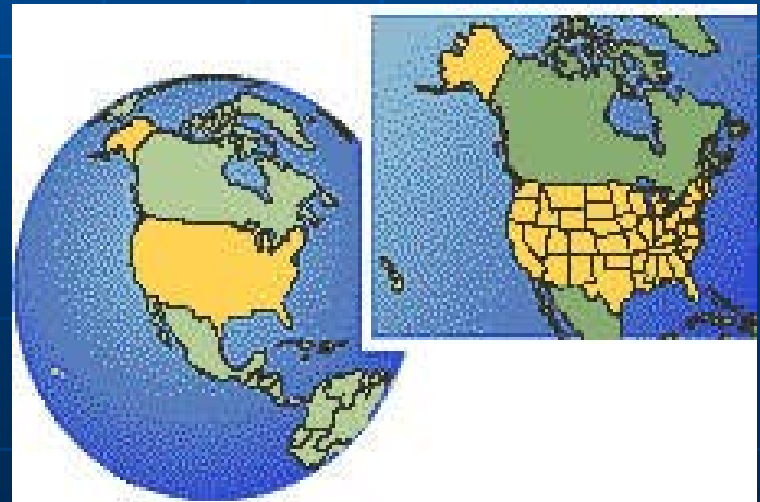
- Active policies to encourage trade are out of balance with passive policies regarding transportation and supply chains.
- Need a framework to understand and respond to local, regional and national goals and priorities regarding transportation and economic growth.
- *Not effectively communicating the necessity to safeguard the national economy (and the environment) to public and elected officials.*

# National Conference Established the Marine Transportation System

- **What?** MTS includes waterways, ports and their intermodal connections (plus vessels, vehicles, and system users) and is a sub-system of the nation's overall transportation system.
- **Why Needed?** The MTS initiative is to ensure the United States can support the level of international traffic in the 21st century in a cost-sensitive, safe, secure, environmentally sound, and efficient manner.

# 1999 Report to Congress on MTS

**The Vision:** *The U.S. Marine Transportation System will be the world's most technologically advanced, safe, secure, efficient, effective, accessible, globally competitive, dynamic and environmentally responsible system for moving goods and people.*



# MTS Report to Congress – Six Critical Issues

## Critical issues faced by US:

- National, regional & local agency coordination
- Infrastructure expansion – port investments
- National security
- Economic competitiveness
- Environment protection



# Recommended Actions

- Users want the Federal agencies to communicate with each other and remove the barriers to business.
  - Action: Formation of the CMTS that reports to the US DOT Secretary
- Users want the opportunity to talk directly with the US DOT Secretary to describe their concerns.
  - Action: Formation of MTSNAC



# The Marine Transportation System and the Federal Role

Measuring Performance,  
Targeting Improvement

TRANSPORTATION RESEARCH BOARD  
OF THE NATIONAL ACADEMIES  
2004

# TRB Special Report 279

- *The Marine Transportation System and the Federal Role: Measuring Performance, Targeting Improvement* calls upon the U.S. Department of Transportation to take the lead in ***assessing the performance of and improving the nation's entire marine transportation system***. In particular, the report recommends that the DOT should begin immediately to develop reports on the condition, performance, and use of the MTS.

What has happen since those  
recommendations were  
formulated?

# Our World is Changing...

The world appears to be getting smaller and moving faster because of advancing technology, expanding global communications, and liberalization of trade



***World in 1990***



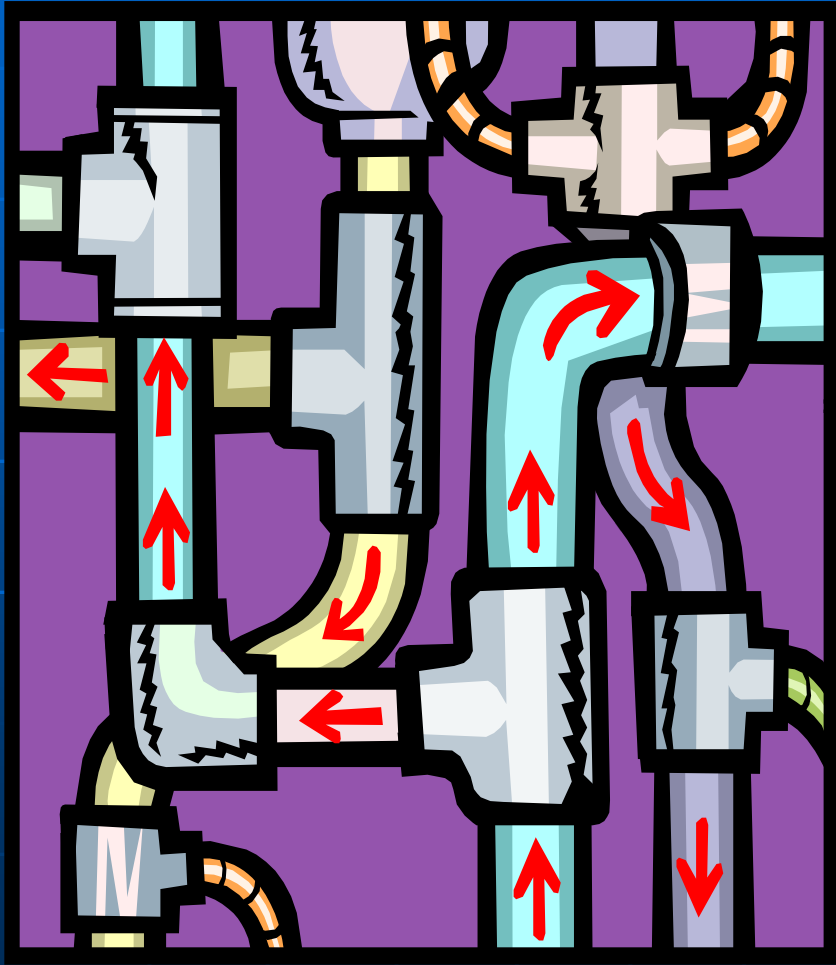
***World in 2012***

...and is increasingly connected!



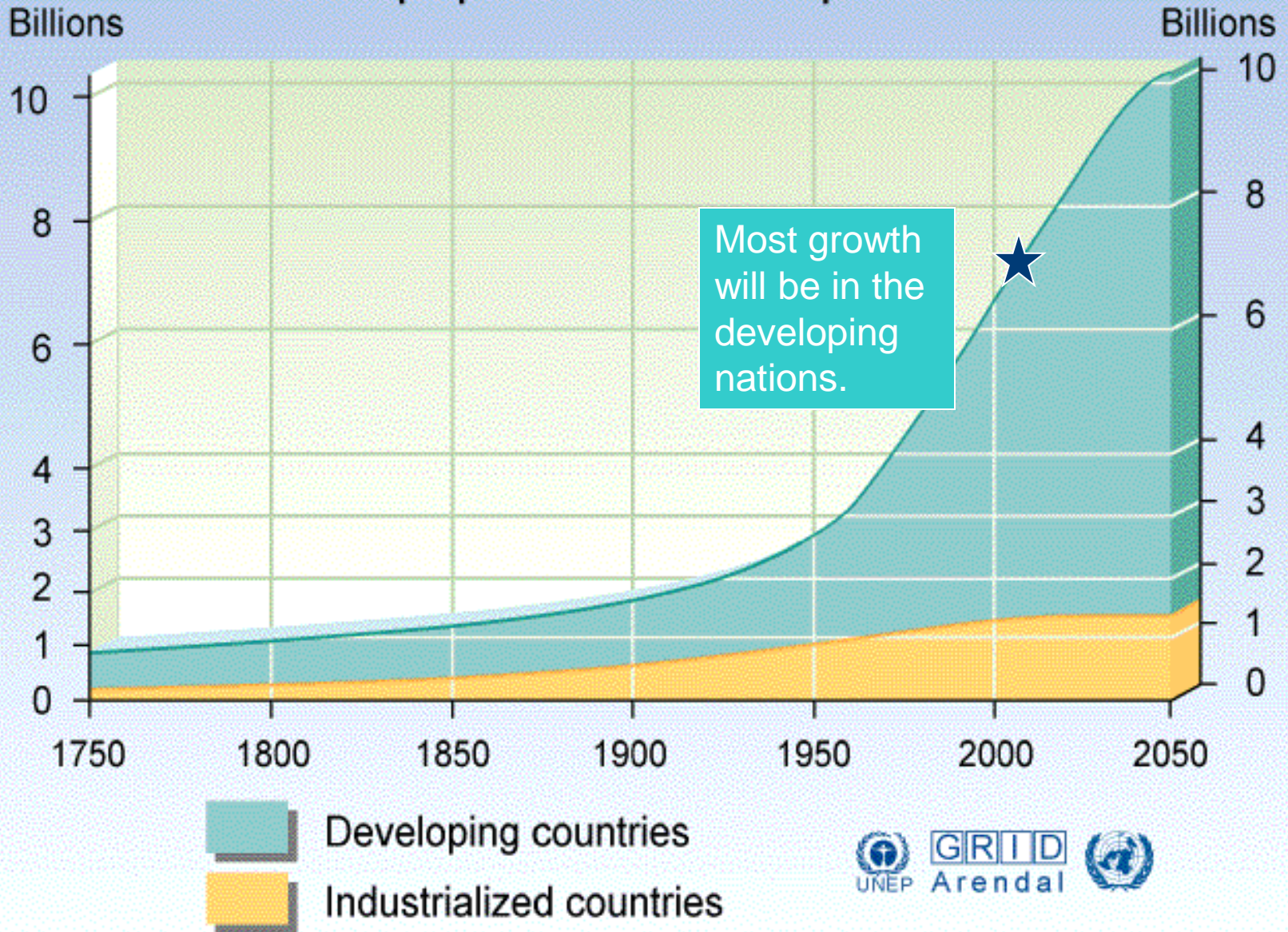
Today's global (and U.S.) economy is highly dependent on efficient, integrated, and uninterrupted operations of its international supply chains and logistic systems.

# From “Point-to-Point” Movement to Continuous Flow Pipelines



- Freight transport is a “systems” issue that must be seen from a local, regional/national mobility perspective.
- The logistics system includes waterways and terminals as well as landside access and distribution centers.

# World population development



# Two Mega-Trading Blocks

North America



South America





# Four Mega-Trading Blocks



# Global Economy Forcing New Transportation Strategies



- U.S is dependent on trade and specifically "maritime" trade.
- Market highly volatile.
- Freight transport is multi-modal activity.
- MTS is constrained by infrastructure and... U.S. lack of transport and freight policy.

# Other Issues

- *Competing supply chains* – Maritime assets work collaboratively with other modes (road & rail) to provide door-to-door logistic services.
- *Emphasis on reliability* – Failure to provide freight on-time causes supply chains to move.
- *Tightening of budgets* – There has been a shift in engineering practice from new construction projects to managing operations and capacity demands with existing infrastructure.
- *Asset maintenance* – Protection to reduce impact of aging assets on service, to extend their useful life, and to avoid supply chain disruptions because of infrastructure failure.

Then the  
“GREAT RECESSION”

How do we resolve the  
continuing CONCERNS?

# MTS – Its Essential Function

The MTS is a public/private-owned global network of infrastructure (waterways, ports, and intermodal landside connections) and operators that allows for the ***movement*** of people and goods to, from, and on the water.



# Looking for Synergies:

**Merging Data &  
Analytics, Asset  
Management, and  
Resilience Tools**

# Technologies Evolve



Turntable to  
& LPs



■ Tape  
Back-up



to DVD  
data  
storage



# Communication Systems Evolution

## From radio to GMDSS Global Maritime Distress Safety System

Incorporates:

VHF-DSC Radio

MF/HF-SSB Radio Telephone

Inmarsat-C

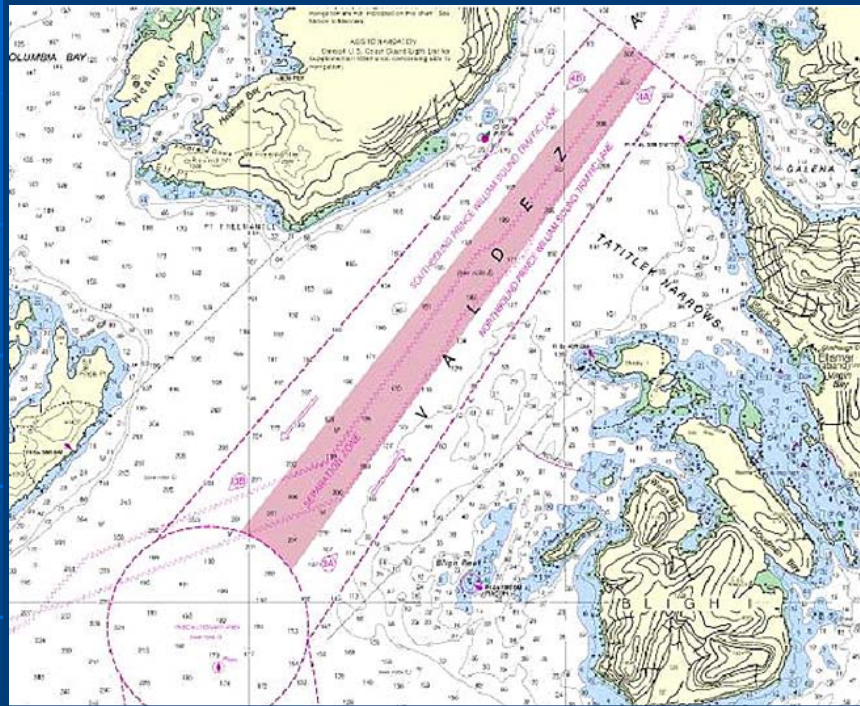
SART

EPIRB





# From Charts to ECDIS for Ships



Source: <http://www.nauticexpo.com/>, 2012

# e-Navigation Goals

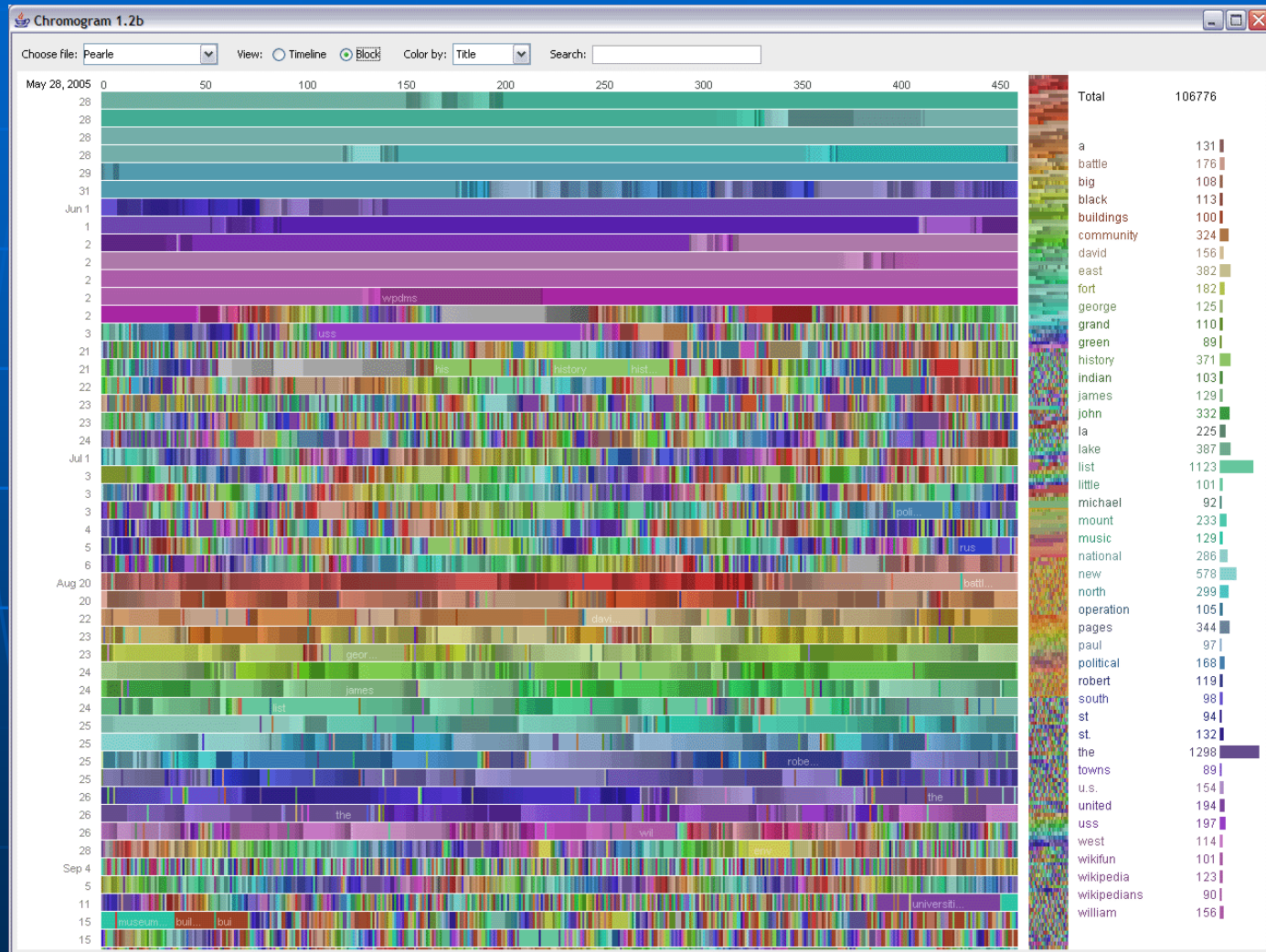
- Increase efficiency of MTS by:
  - Maximize effective **capacity of waterways**
  - Maximize the carrying **capacity of vessels**
  - Reduce **travel time**
  - Reduce **transport costs**
  - Reduce **fuel consumption**
- Provide efficient link between transport modes
- Reduce polluting emissions and spills due to accidents, illegal actions or normal operations

# New Technologies Cargoshell

Dutch company that has produced first of the "Smart" containers.



# Big Data: “data rich & analysis poor”



Source: [http://researcher.watson.ibm.com/researcher/view\\_project.php?id=3419](http://researcher.watson.ibm.com/researcher/view_project.php?id=3419)

# Data and Analytics

- Analytics is the discovery and communication of meaningful patterns in data, particularly large data sets.
- The simplest definition of analytics is "the science of analysis".
- It relies on the simultaneous application of statistics, computer programming and operations research to approach research problems in business and government.

# Conference Examples

- *Vern Gwin* – USACE's Strategic Navigation Initiative & National Dredging Quality Management Program - benefits include common access, data availability, and increase participation
- *Jim McCarville*, Port of Pittsburg – broadband communications for AIS/LOMA and other applications
- Working toward mobile device availability for field applications

# MTS - Asset Intensive Sector

- The MTS is experiencing growth with its associated ports and intermodal connectors experiencing congestion.
- Investments are needed to increase port/intermodal capacity.
- However, because it is an asset intensive industry, the MTS is increasingly capital constrained (particularly since the 2009 recession).



# 2009 Infrastructure Report Card

## ■ Grades

- Aviation D
- Bridges C
- Dams D
- Drinking Water D-
- Energy D+
- Hazardous Waste D
- Inland Waterways D-
- Levees D-
- Rail C-
- Roads D-

**Transportation  
infrastructure is  
deteriorating!**

- America's Infrastructure GPA: D
- Estimated 5 Year Investment Need: **\$2.2 Trillion**



# Take Care of What You Got!



World's Oldest  
Marathon  
Runner

Fauhja Singh turned **100 years old** in April 2011.

(Source: [www.extremelongevity.net](http://www.extremelongevity.net))

# MTS Portfolio Management



Regardless of the type of money (i.e., capital, daily operations, maintenance dollars), we should ask:

“What is the best use of the **next dollar** to maximize the value of the business to our customers and to get the best return on investment for our shareholders?”

# What is Asset Management?

- Asset management is a system whereby property of value is monitored, maintained, and replaced to meet its function or mission.
- Asset management considers all aspects of asset's economic life cycle including its retirement, disassembly, recycling and disposal.

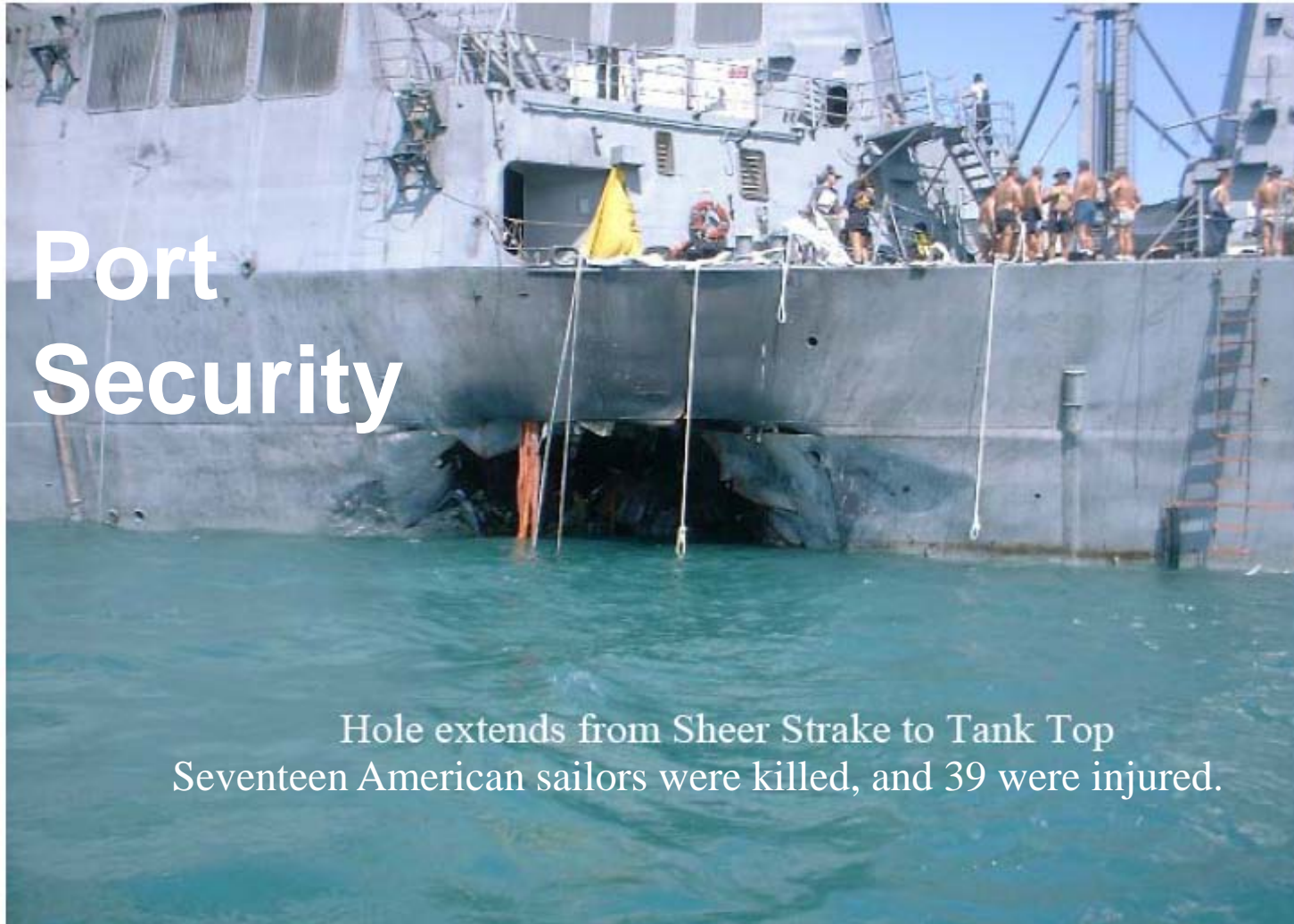
# Conference Example

- *George Domurat*, USACE's CSMART is an asset management tool for analyzing coastal structures to maximize return on rehabilitation investments and minimize risks
- Uses 3 tier process to screen assets, assess risks, and prioritize investments of scarce resources

# Reliability and System Resiliency

# Yemen 2000

## Port Security



Hole extends from Sheer Strake to Tank Top  
Seventeen American sailors were killed, and 39 were injured.



# Natural Disruptive Events

- Earthquakes: Haiti (2010), Chile (10), Japan (11)
- Hurricanes: Andrew (1992), Ivan (04), Katrina (05)
- Tidal waves (tsunami): Sumatra (04), Japan (11)

# Calculating Risk

$$\text{Risk} = [ \text{Threat} \times \text{Vulnerability} \times \text{Consequence} ]$$

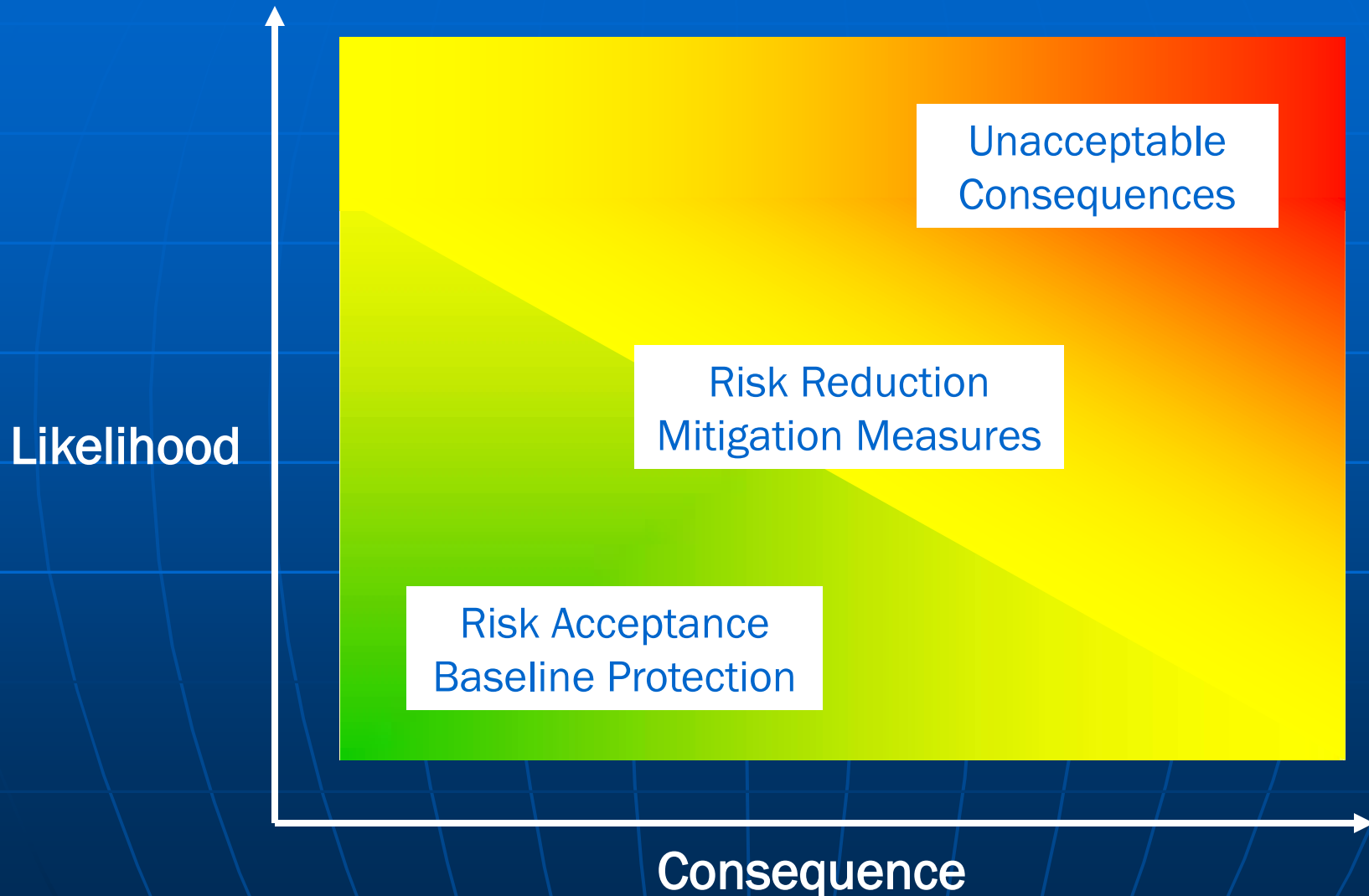
- Threat – potential cause of unwanted event
- Vulnerability – likelihood that safeguards will fail
- Consequence – magnitude of the negative effects

*"While commercial aviation remains a possible target, terrorists may turn their attention to other modes. Opportunities to do harm are as great or greater in maritime or surface transportation"*

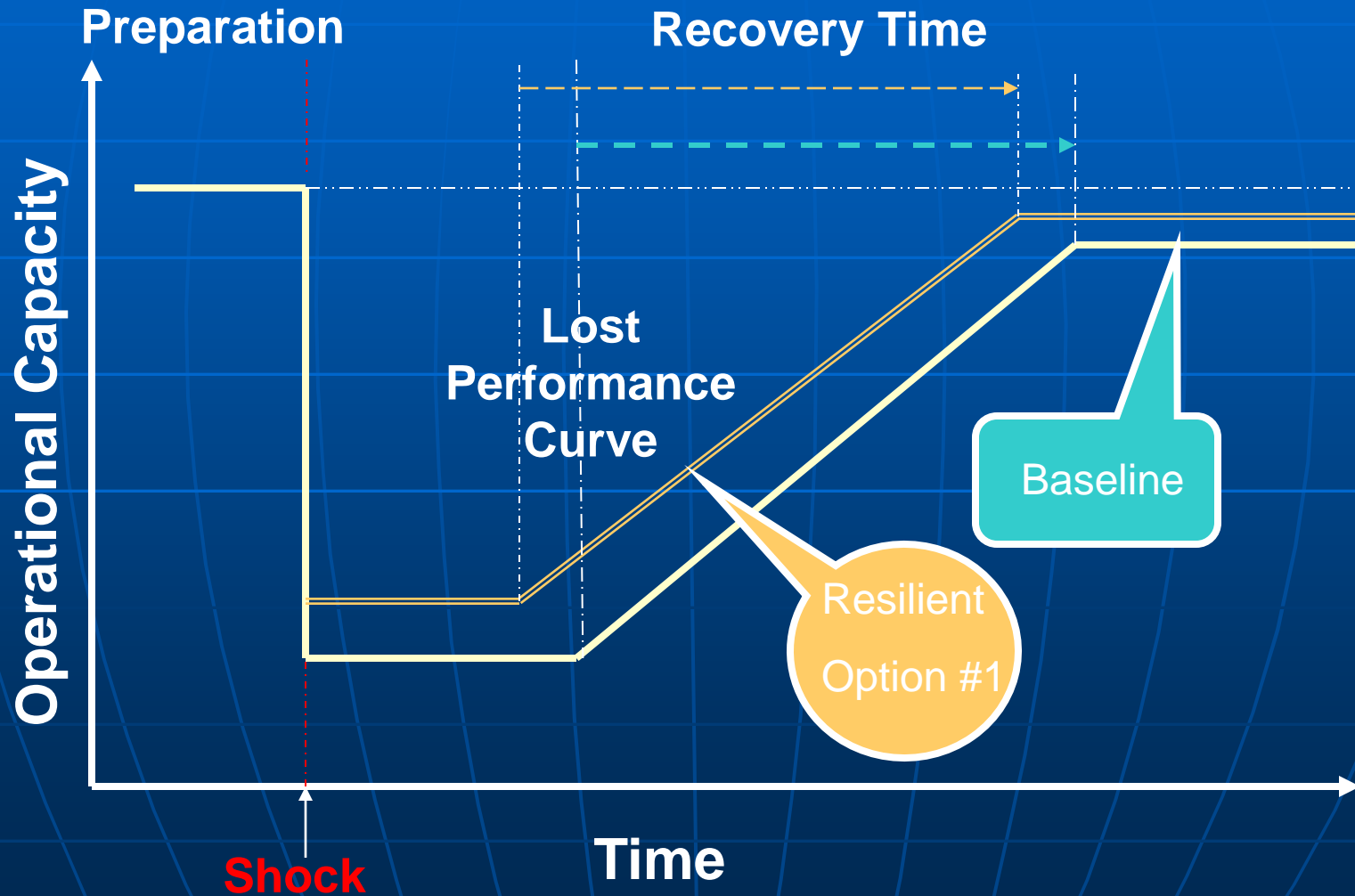
- 9/11 Commission Report



# Understanding Risk



# Resiliency-Recovery Curve



# Finding New Synergies



Does this provide approach

Value to the Nation?

# Connect with Stakeholders

- *Sean Connaughton, Greg Edwards* and others mentioned the need to highlight jobs and economic development for elected officials.
- *Heather Nachtmann* described her experiences of identifying the audience (e.g., part-time Fire Chief) and speaking to communicate.

# Connect to Cash Flow

- *John Grey, AAR*, said that MTS performance must be related to cash flow produced by asset or services – that network reliability is critical and must be put in terms of dollars!
- *Mary Brooks* described the Halifax campaign titled 'Ships Start Here' where the message was carried by the public and resulted in \$33 billion for ship construction in the region!

# “Traffic problems tied to the economy”

- The 2011 Urban Mobility Report, published by the TTI at Texas A&M University, illustrates impacts of congested conditions in 2010:
  - The amount of delay endured by the average commuter was 34 hours, and the cost of congestion is more than \$100 billion.
  - Congestion is becoming a bigger problem outside of “rush hour,” with about 40 percent of the delay occurring in the mid-day and overnight hours, *creating an increasingly serious problem for businesses that rely on efficient production and deliveries.*

# Congestion Can Be Addressed

- Time is money and delays in goods transport hurts the economy.
- State DOTs are already using IT and Smart technologies to fight local congestion and asset management tools to deliver state-of-good-repair conditions on their roads and transit.
- Congestion is easy to explain!



# Low Hanging Fruit

- CMTS assists agency communication and reports to the Secretary of DOT
- MTSNAC assists industry explaining their concerns to government (DOT) through the Secretary of DOT
- **HAVE THE TWO GROUPS MEET ANNUALLY TO DISCUSS THE ISSUES AND NEGOTIATE THE SOLUTIONS with SEC. DOT.**

**THAT WOULD BE  
VALUABLE**

**TO THE MTS AND**

**TO THE NATION!**

# Join The War on Congestion



**For National Economic Security!**