



**GLOBAL  
CONTAINER  
TERMINALS**  

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**USA**



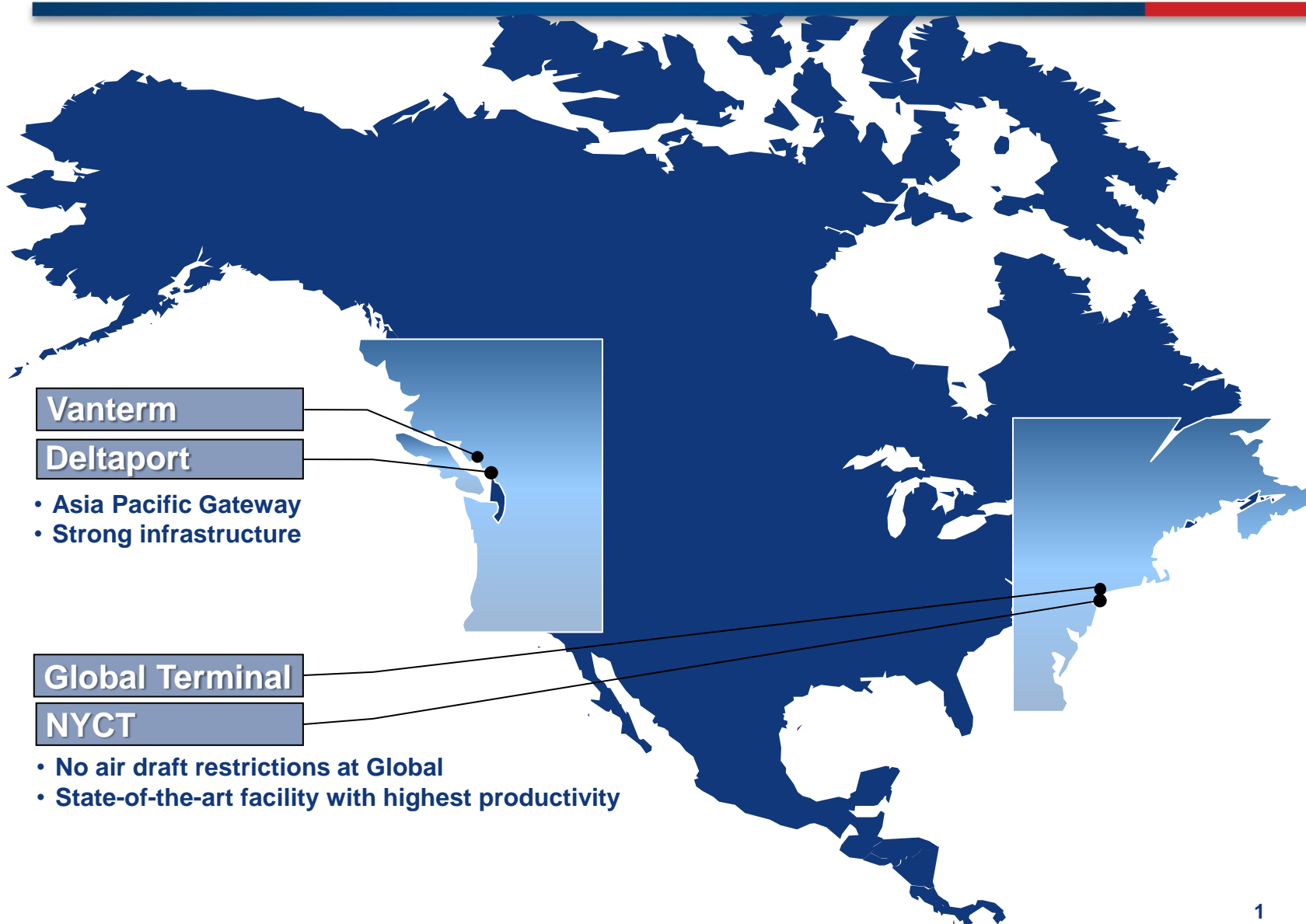
**TRB**

**Innovative Technologies for a Resilient Marine  
Transportation System**

**Rich Ceci  
GCT USA, VP IT**

# Introduction

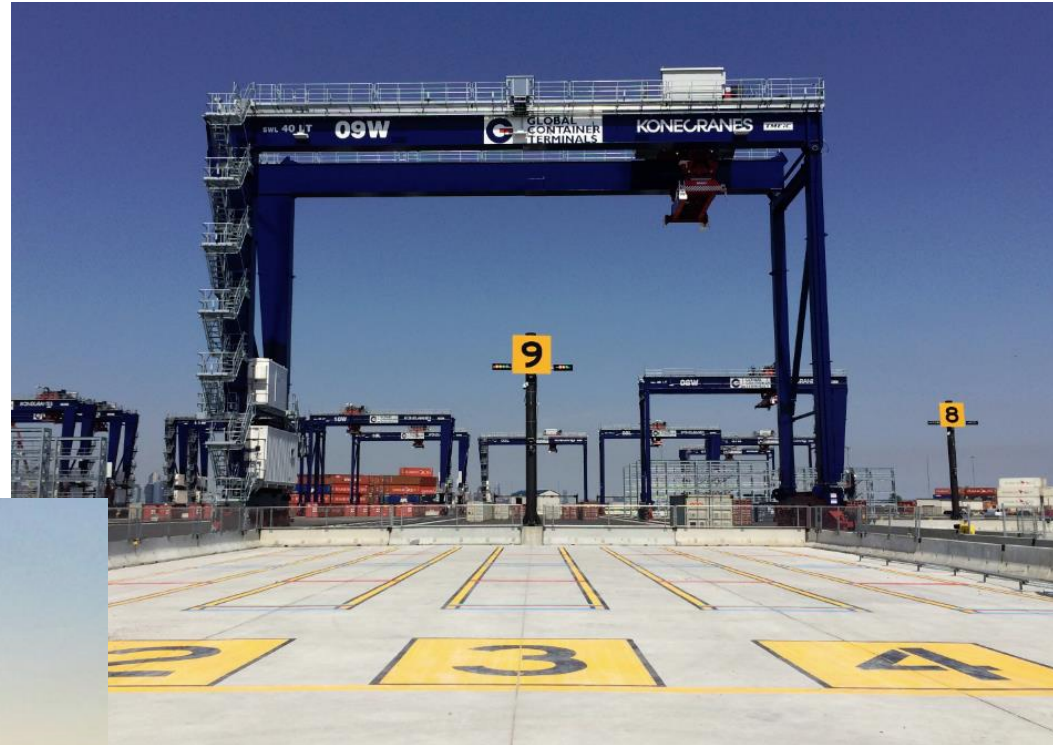
## GCT Terminal Locations



# My Background



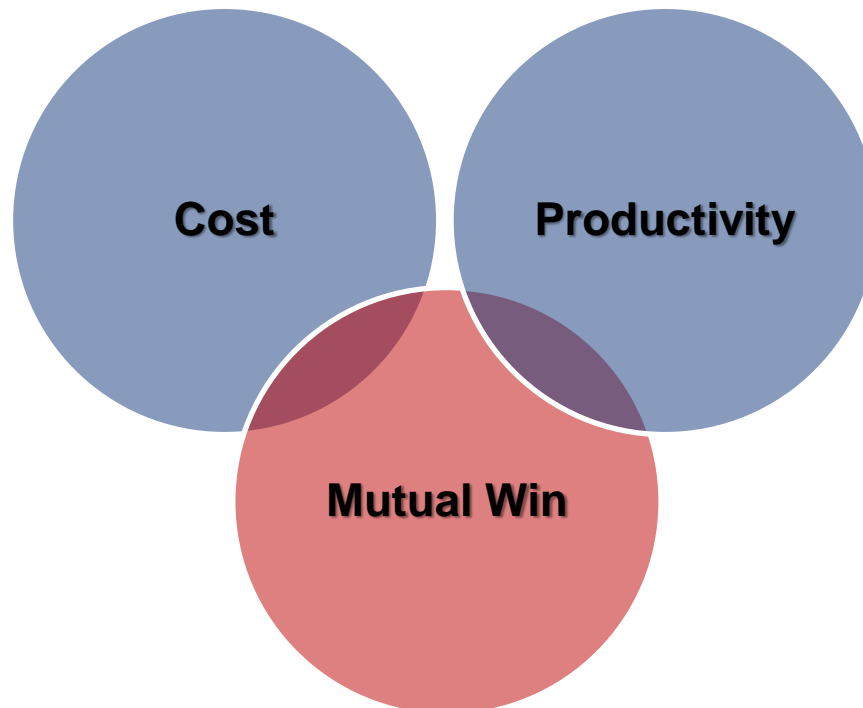
# My Background



# Cost vs. Productivity

## Productivity facts:

- Lower cost does not imply higher productivity
- Majority of point technology solutions focus on decreased cost, not increased productivity



# Automation Objectives

## Top priority is safety: keeping people out of harm's way

### Efficiency: improved stakeholder value

- Land and equipment usage
- Berth space
- People

### Productivity: improved customer value

- Highest production
  - Target at 37-40 GMPH
  - Faster at 30% above harbor average
- Increased time savings
  - Cost savings from reduced time at port
  - Faster truck turn-times
  - Faster truck lines and improved road utilization

# New Operating Paradigm

- **Yard Move Costs**
  - Much lower –so managing these are not as critical
- **Yard Planning**
  - Largely counter productive
- **Operational Discipline is CRITICAL**
  - Some loss of agility
  - Automation works one way – keeping in sync is mandatory

**Variability is the enemy of productivity and the source of MOST safety issues**



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# New CHE



**RMGs**



**Shuttle Trucks**



**Translifters & Cassettes**



# Automation Principles

- 1. 100% accuracy required for:**
  - Container identification
  - Movement tracking
- 2. Validation required to prevent loss and increased cost upon container entry and exit.**
- 3. Full automation implies lower operating cost and lower productivity (today).**
- 4. Semi-automation implies somewhat higher operating cost and much higher productivity (today)**
- 5. Reliability of computer network is critical.**
- 6. Management of terminal truck traffic flows is necessary.**

# Automation Demands

1. Preventative equipment maintenance.
2. Technically-competent maintenance staff.
3. No Ad-hoc operational workarounds .
4. Consistent usage.



# Semi vs Full Automation

<b>Semi-Automation</b>	<b>Full-Automation</b>
<b>Manned horizontal transport</b> (shuttle trucks)	<b>Automated horizontal transport</b> (AGV / AutoStrad)
<b>Lower up-front investment</b>	<b>Higher initial CapEx</b>
<b>Decoupled</b>	<b>Coupled</b>
<b>Higher vessel productivity</b>	<b>Lower operating cost</b>
<b>Improved operational agility</b> from human operators	<b>Safety costs critical</b>
	<b>Slower ramp-up from longer</b> debugging time

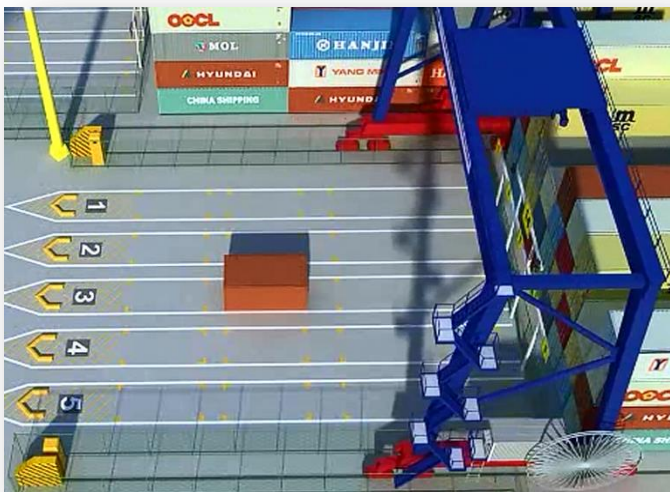
# De/Coupled Equipment



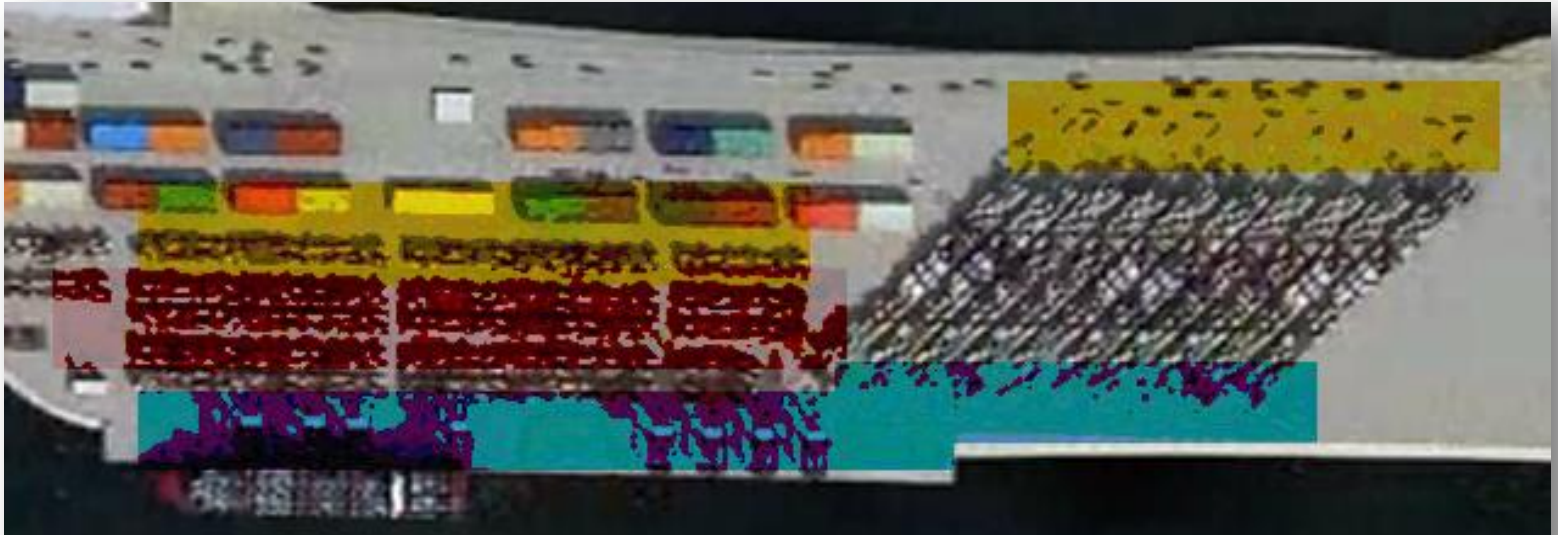
**DECOUPLED:** Containers are placed on the ground. No inter-machine dependence.



**COUPLED:** Containers are placed on the other equipment. Machine delays are more common



# Distances & Interference



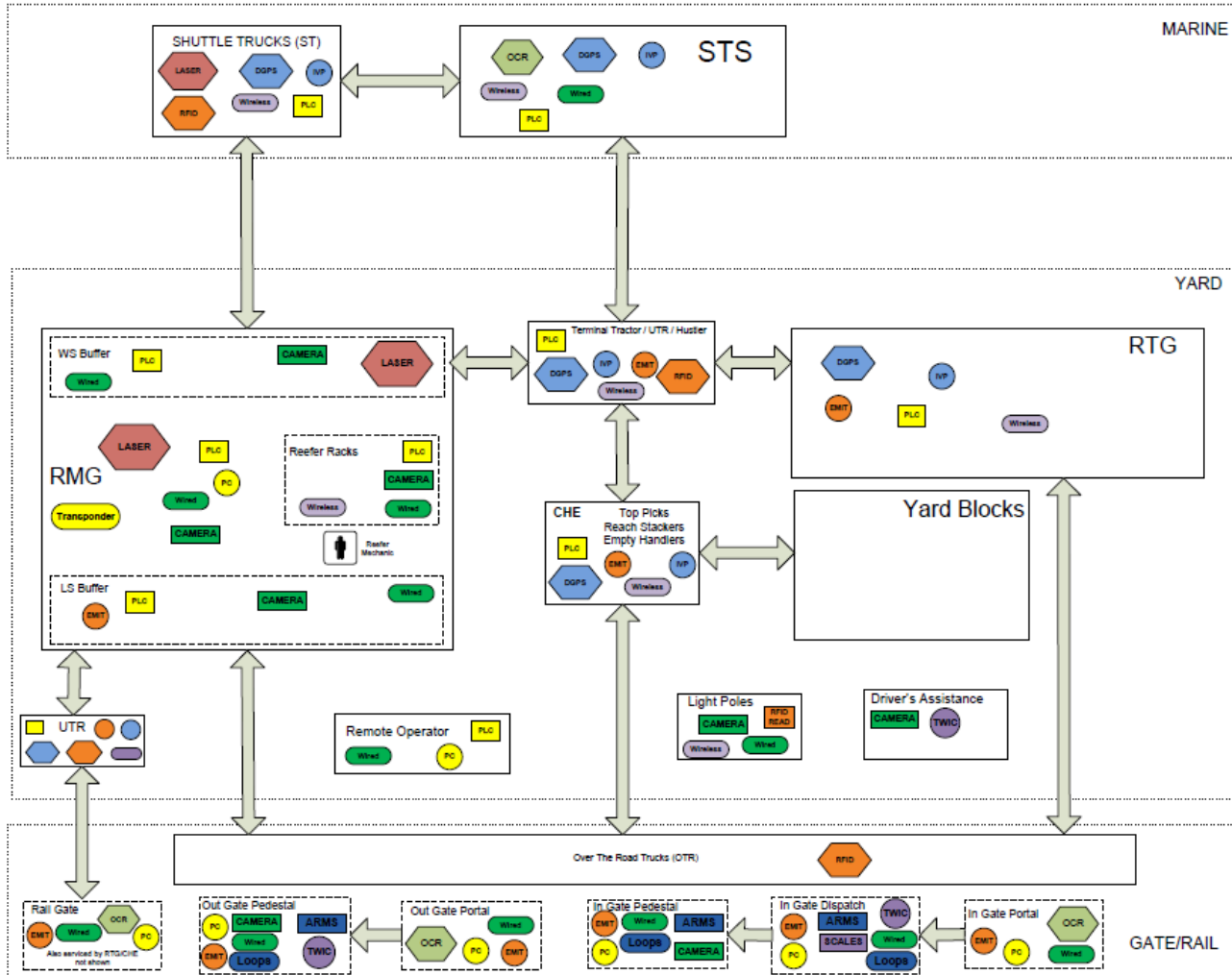
## Conventional RTG

## New RMG

- **Conventional RTG operation impacts port productivity as land operations interfere with vessel operations**
- **New RMG operation does not have interference as trucks and terminal operations separated**
  - **40% more containers per acre**
  - **85% Faster (operating cycles)**

# GCT Technology Map

KEY





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# Optical Character Recognition



# Differential GPS

- **Vehicle system scope:**
  - 79 UTR
  - 17 CHE
  - 17 RTG
  - 17 ST
  - 8 STS
- **Driver assist**
- **Full vehicle integration**
- **DGPS**
- **Inertial navigation**
- **Laser locators**
- **Vehicle telematics**
- **TOS integration**





# TOS Platform



**N4**

Global N4 Project  
October 31, 2011

FIRST in North America!

# The Next Steps

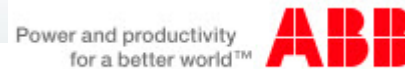
- Automation stresses physical resources
- Truck traffic control key
- Appointments
- Port-wide system
- RMG block level
- RFID integrated





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# Key Suppliers & Partners



THE PORT AUTHORITY  
OF NEW YORK & NEW JERSEY

