

## **Information Technology & Cargo Security: Can We Have It All?**



# What are we trying to achieve?

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- Move containerized cargo faster
- Improve terminal utilization and throughput
- Reduce overall cost
- Reduce environmental impact
- Improve cargo security

From  
***FASTER, BETTER, CHEAPER***  
to  
***FASTER, BETTER, CHEAPER, and CLEANER***  
to  
***FASTER, BETTER, CHEAPER, CLEANER, and SAFER***

# Productivity: The Hong Kong Myth

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**“The US is disadvantaged in the global marketplace because our container ports are inefficient compared to world-class ports such as Hong Kong and Singapore.”**

- **Hong Kong, Singapore, and other “world class” ports squeeze more throughput through an acre because they have to, and it is expensive.**
- **As long as West Coast ports have the space, wheeled operations are efficient and customer-responsive.**
- **Some West Coast ports will run out of land and face transition to more intensive operations in about 2010.**

# Wheeled container terminals

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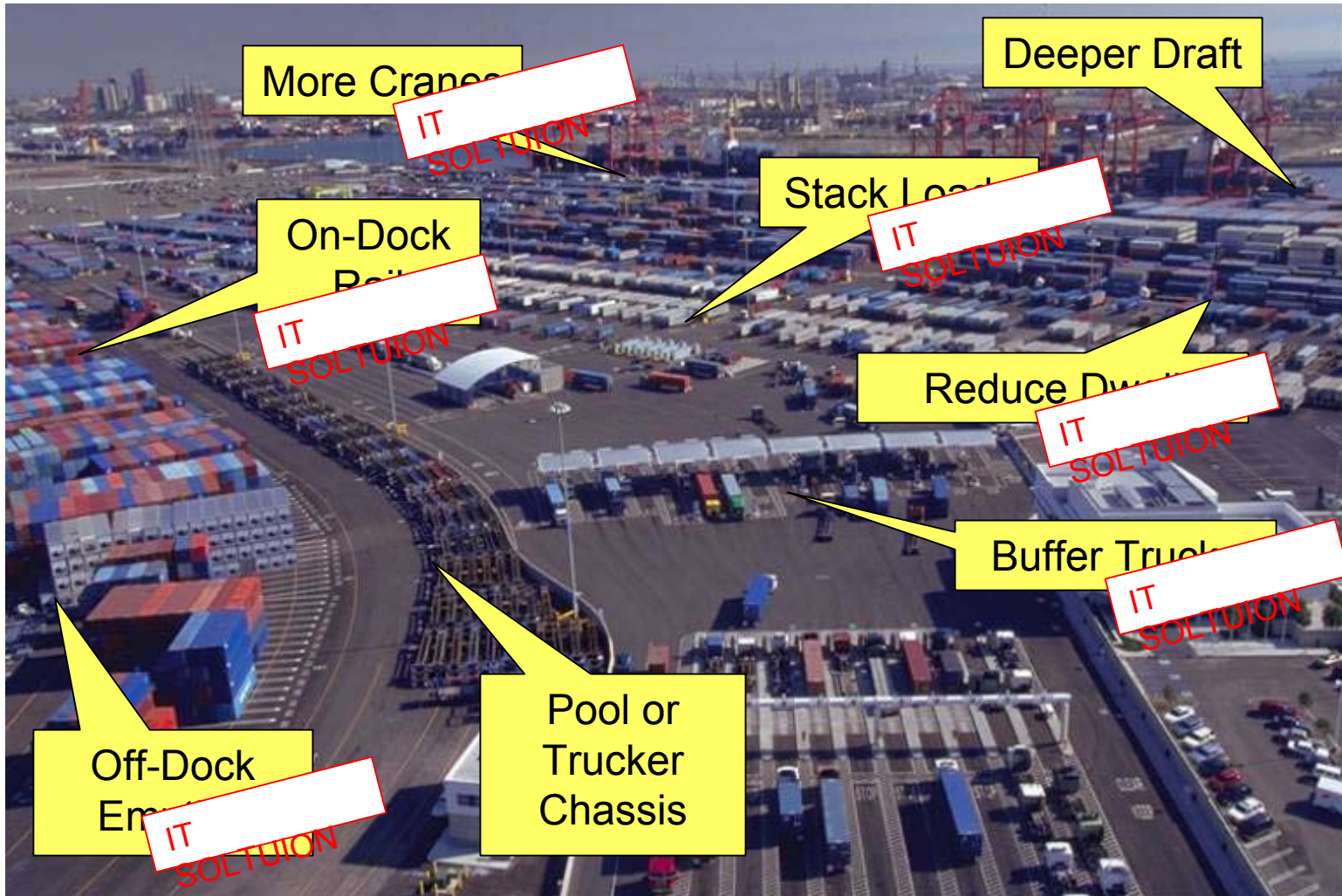
## It's been fun...

- Plentiful port land made wheeled terminals possible
- Low cost – driver finds the box
- Low tech – manual or semi-automated
- Low capital
- Customer responsive

## ...but it's over.

- Poor utilization of scarce land
- Intractable chassis problems
- Poor security
- High emissions

# We need to make a few changes



# Container Port Transition

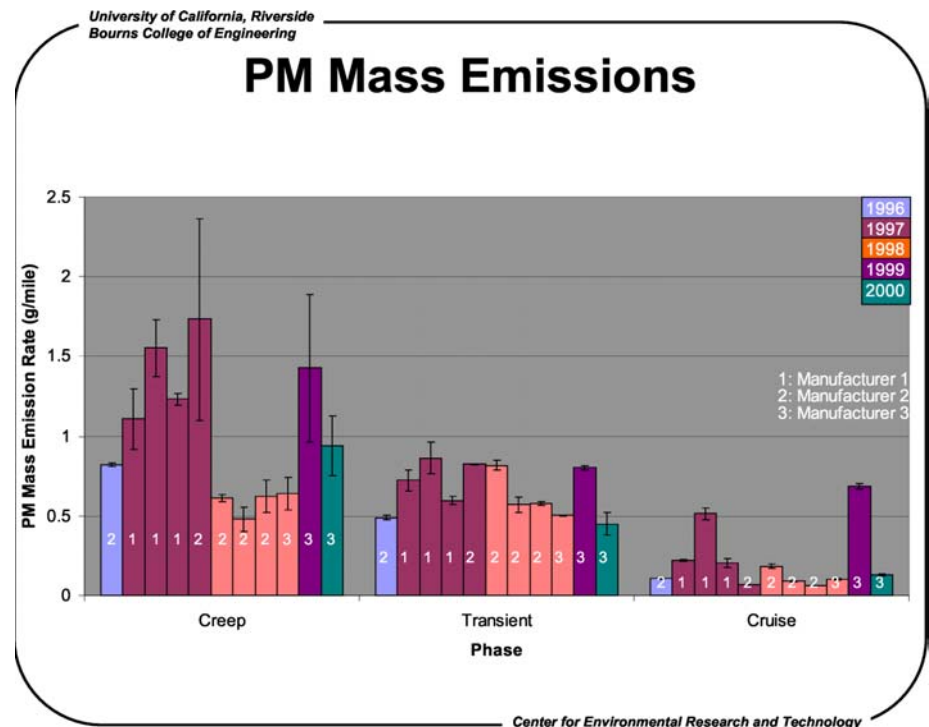
Information technology is a key to successful transition to intensive land use and terminal operations.

	Terminal System	Gate System	Chassis System	Empty Storage	Rail Transfer
<i>Container Port (Oakland, 1970s)</i>	Wheeled	Manual, paper	Individual lines	On-dock	Off-dock
<i>Intermodal Port (Tacoma, 1990s)</i>	Mostly wheeled, some stacked	Manual, paper & computer	Individual lines, some pooling	On-dock, some depots	Mixed on/off-dock
<i>Transition Port (_____, 2000-2010)</i>	Mostly stacked, some wheeled	Semi-automated & paper	Steamship line chassis pools	Mostly depots, some on-dock	Mostly on-dock
<i>Intensive Use Port (_____, 2010+)</i>	Stacked	Automated	Customer or trucker chassis	Off-dock depots	Primarily on-dock

# Can we do it greener?

Yes. The queuing, idling, and excess drayage trips that hurt productivity are also the worst emissions problems.

- Stacked terminals will allow us to reduce drayage tractor idling and use “greener” yard equipment.
- Appointment systems, empty management, and better scheduling though IT will reduce unnecessary drayage trips and queuing.



# Where are the “homeland security” threats?

## Compromise

- Undetected container access
- Primary threat for pilferage
- Addressed by cargo seals and facility access controls

## Collusion

- Access to container shipments provided or allowed by a supply chain participant
- Primary threat for smuggling or cargo theft
- Addressed by personnel screening and access controls

## Conspiracy

- Adversary participants in the supply chain
- Greatest threat of terrorism
- Addressed at present only informally

**MOST TECHNOLOGY APPLICATIONS ARE FOCUSED ON THE SMALLEST THREAT**

# Can we improve container security?

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- **Keep terminals secure**
  - Limit and control access
  - Stacked is better than wheeled
- **Keep containers moving**
  - Dwell time in terminals is **IT SOLUTION** risky
  - Dwell time on the street is very risky
- **Keep containers sealed**
  - Electronic or optical seal and container number recognition
  - Track and verify seals across handoffs
- **Track and monitor the movement**
  - Who has the box?
  - How long have they had it?
- **Know who we are dealing with**

# Container Port Transition

Information technology is a key to successful transition to intensive land use and terminal operations...**and to improved security.**

	Terminal System	Gate System	Chassis System	Empty Storage	Rail Transfer
<i>Container Port (Oakland, 1970s)</i>	Wheeled	Manual, paper	Individual lines	On-dock	Off-dock
<i>Intermodal (Tacoma, 1980s)</i>	Wheeled	Manual & paper	Individual lines, pooling	On-dock, some depots	Off-dock
<i>Transition (_____, 2000-2010)</i>	some wheeled	Semi-automated & paper	Shared chassis pools	Mostly depots, some on-dock	Mostly on-dock
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**GATE AUTOMATION FOR REDUNDANT REAL-TIME CHECKING**

**FACILITATES CHASSIS TRACKING**

**LESS STREET EXPOSURE**

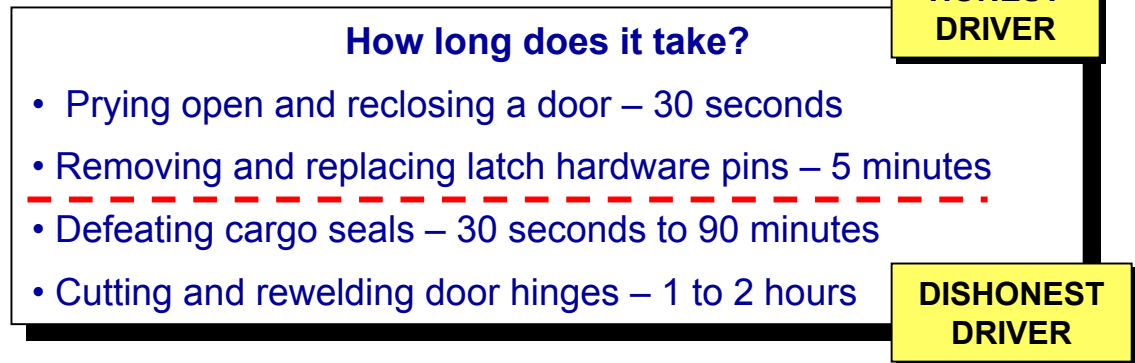
**STACKED IS MORE SECURE THAN WHEELED**

**BETTER ACCESS CONTROL**

# Hard facts and implications

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- Biometrics can verify identity, but not honesty.
- Loading dock collusion or conspiracy can defeat any technology.
- No cargo seal is perfect.
- GPS is not secure.



## Implications:

1. We need to qualify and verify participants .
2. We need to detect two-hour trip discrepancies through supply chain visibility.
3. We need to “raise the bar” through seal technology to prevent undetected compromise with an honest driver.

# RFID is not a silver bullet for security

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- **RFID can assist in gate and terminal automation**
- **RFID does not address collusion or conspiracy**
- **E-seals are not a security solution**
  - E-seals are only as secure as the physical components
  - RFID can make commodity and destination identification available to adversaries or thieves
- **“Smart” containers are not yet practical**
  - Prohibitive capital and operating costs
  - Daunting implementation problems
  - Doubtful security

“While e-seal technology was, in general, found to be mature and immediately applicable to container security, it was recognized that these devices alone would have only a limited impact on improving container security.”

– CHCP Container Seal Report, July 2003.

# IT for SCM and Participant Verification

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## Supply Chain Management

- Chain of custody
- End-to-end visibility
- Monitoring for deviations
- Performance against plan and schedule

- Who has my box?
- What are they doing with it?
- How long are they taking?
- Should I be concerned?

## Participant Verification

- Unique identifiers
- “Known Shipper” database
- Pre-shipment verification of identity, ownership, and legitimacy

- Who am I dealing with?
- What is their record?
- How are they organized, financed, and controlled?
- Can I trust them?

# Can we have it all?

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## Almost.

- We can have better, faster, safer, and cleaner, but not cheaper.
- We can no longer use land to solve our problems, and that means major capital and IT investments to accommodate growth.
- IT can increase labor productivity, but not replace labor.
- Security, in particular, requires people as well as technology.
- Real security requires IT outside the terminal for SCM and participant verification.
- If we are smart, the capital investments and increased operating costs required to accommodate cargo growth will also improve security and reduce environmental impacts.