

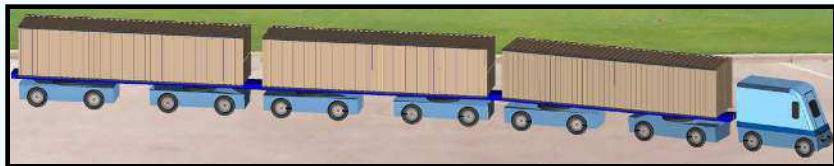


# *CargoTram*<sup>TM</sup> Alameda Corridor Low Emission Cargo Transport

The Green  
Public or  
PPP Option

Near-term & Low-cost Solution  
for LB & LA Ports Cargo  
Container Freeway Truck Problem

No Costly  
I-710  
Expansion



Dockside & road CNG-hybrid truck operation



Elevated *SuperWay* electric operation

## Reduced Trucks & Air Pollution at Affordable Cost

**ROAM Transport Systems, Fort Worth, Texas**

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ROAM graphics & photos

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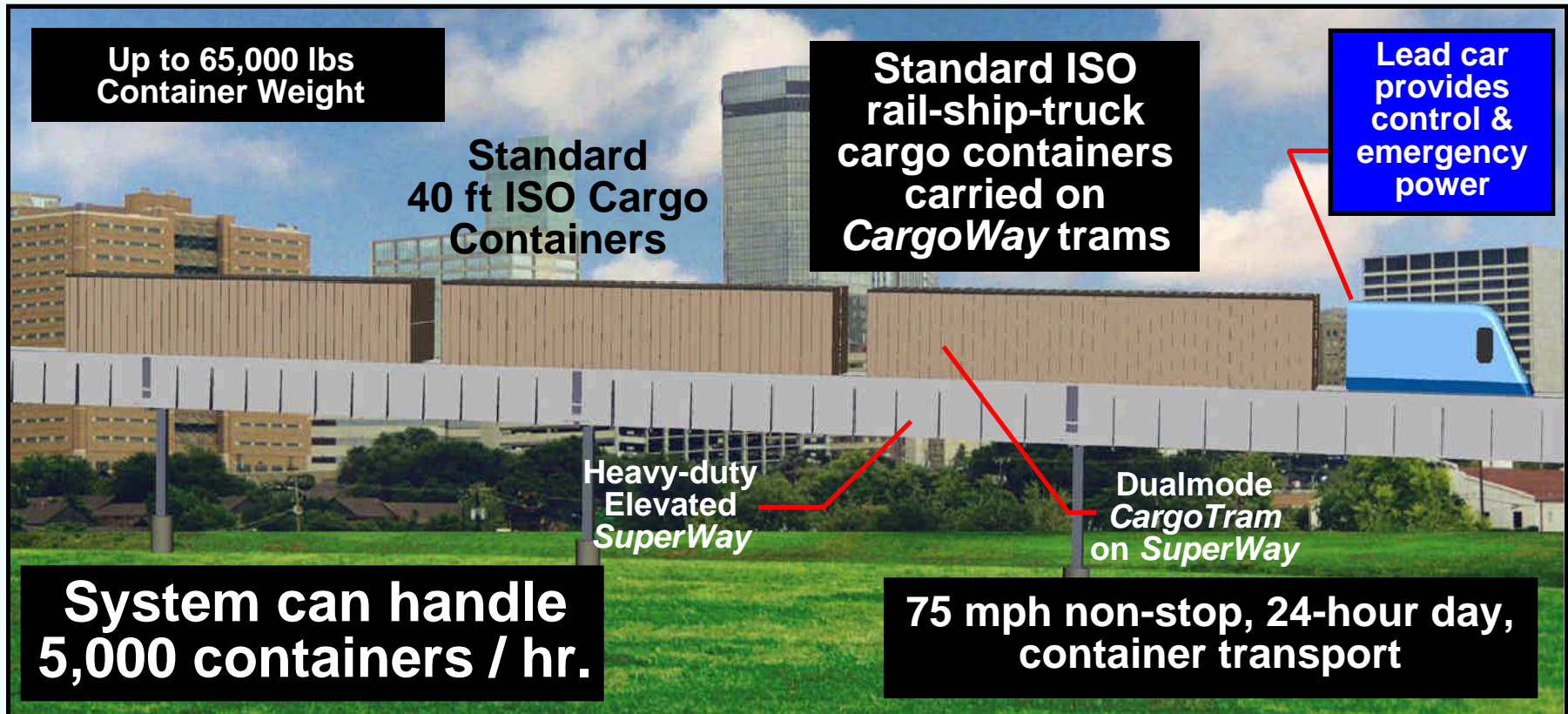
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# The Key Objectives

- **Move the containers – Current & future**
- **Eliminate most container truck traffic**
- **Eliminate deadly diesel exhaust fumes**
- **Avoid costly & disruptive I-710 mods**
- ***Do it at the lowest risk and cost !***

# CargoTram™ Heavy Cargo System

Containers on electrically-powered dualmode trams



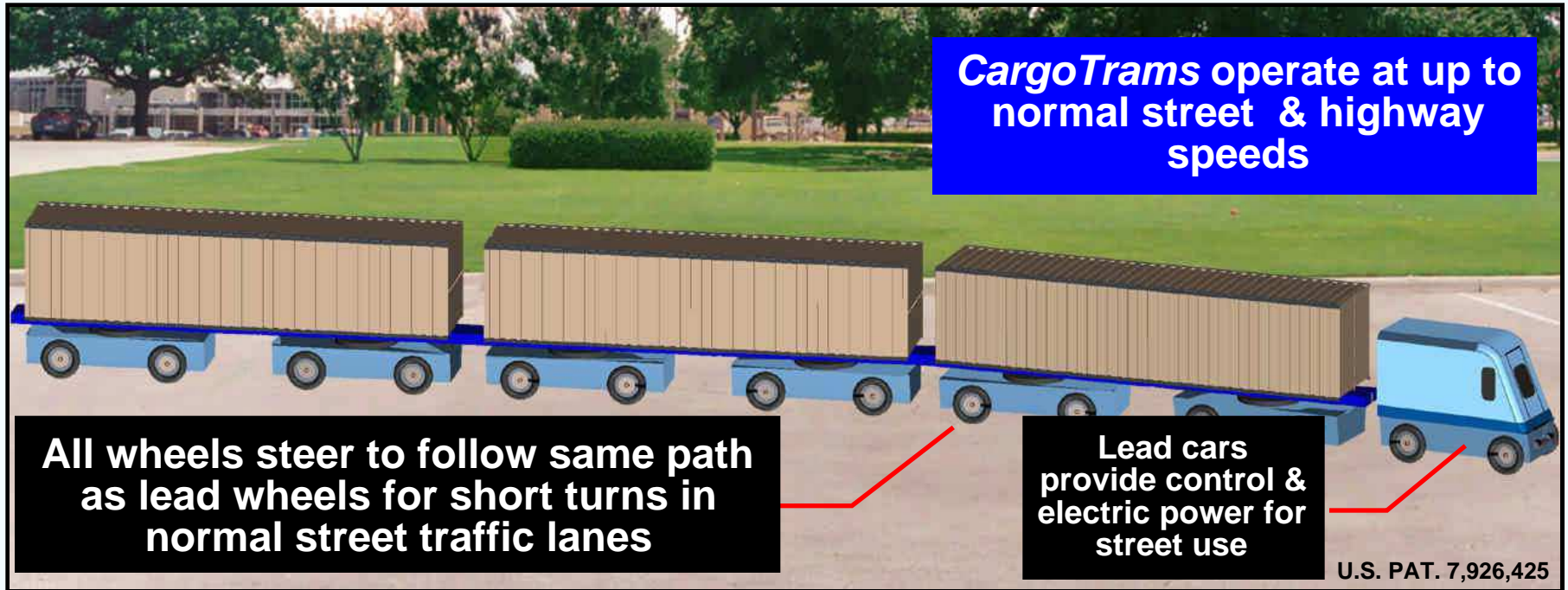
Three car tram shown – Longer or shorter trams may be used  
( Dualmode trams may enter and exit SuperWay at *MULTIPLE* points )

U.S. PAT. 7,926,425

( I-710 TAC incorrectly classified CargoWay as fixed guideway system )

# Port, Transfer Facility & Street Operation

Containers move on hybrid powered dualmode trams



Dualmode *CargoTrams* operate in port, rail yards, on streets & roads as trucks

Three-car tram shown – Longer or shorter trams may be used

( Three-car trams provide **70,000** containers / day rail capacity )

**No new dockside or transfer terminal installations**

# ***CargoTrams* are not “fixed guideway” Systems**

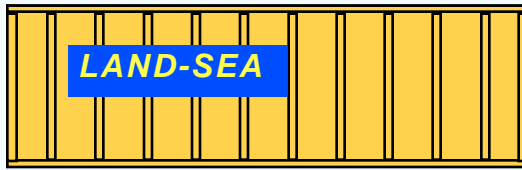
**Trams run on *SuperWays* & on the the ground**

- ***CargoWay* is not just a “fixed guideway system”**  
( Incorrectly considered by I-710 TAC as “fixed guideway )
- ***CargoTrams* are dualmode – Roads & *SuperWay***
- ***SuperWays* have multiple entry & exit ramps**
- ***SuperWay* entrances & exits end at port boundary**
- ***SuperWays* – elevated, low-weight super-freeways**
- ***No added space or facilities in ports & rail yards***

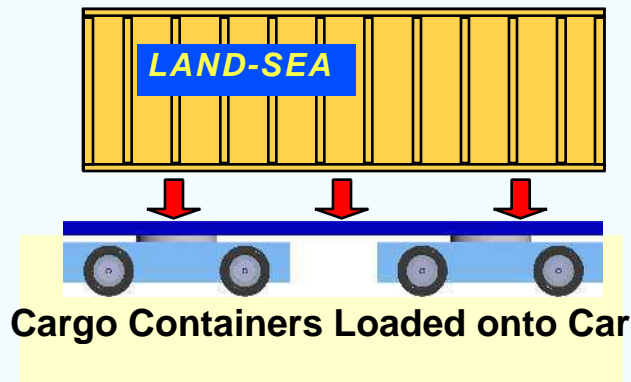
**Trams run as battery/CNG hybrid trucks on ground**

# Easy *CargoTram* Loading on Ground

Platform can carry  
standard 20 & 40-ft  
ISO containers



Standard Land-Sea Cargo Container



- Standard land-sea ISO cargo containers are easily loaded
- Standard dockside & transfer area container handling equipment
- *No new equipment needed!*
- Same as loading truck

**Fully compatible with current cargo facilities**

# Capability Overview

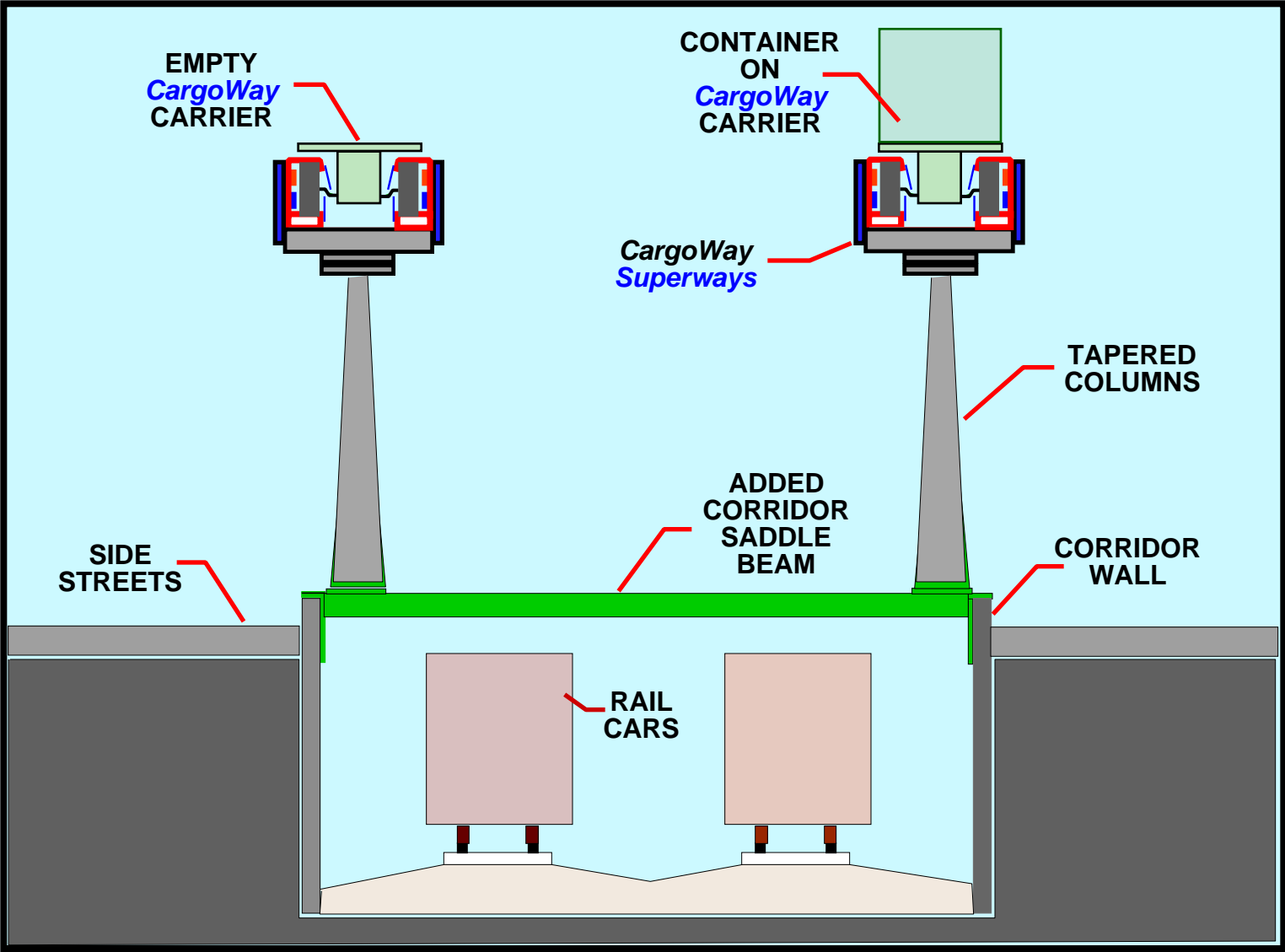
## Dedicated Heavy *CargoWay* Lines

- **Low-cost** elevated ***SuperWay*** – Over any ROW
- Electrical Power on ***SuperWay*** – Low air pollution!
- Car-based switches – **Allow multiple entry/exits!**
- **Dualmode Hybrid Operation** – CNG generator power
  - For port, rail yard, street & highway operation
- ***CargoTrams*** Load and Unload – Just like trucks
- Max ***SuperWay*** Capacity – 5,000 veh / hr / dir @75-mph

***Quake resistant, bolted together,  
low-mass steel SuperWay on steel posts***

# Sit-on-Top Alameda Corridor Installation

*No impact on Alameda Corridor rail line or Street Traffic*





# Ports & LA MTA Studied Truck Problem

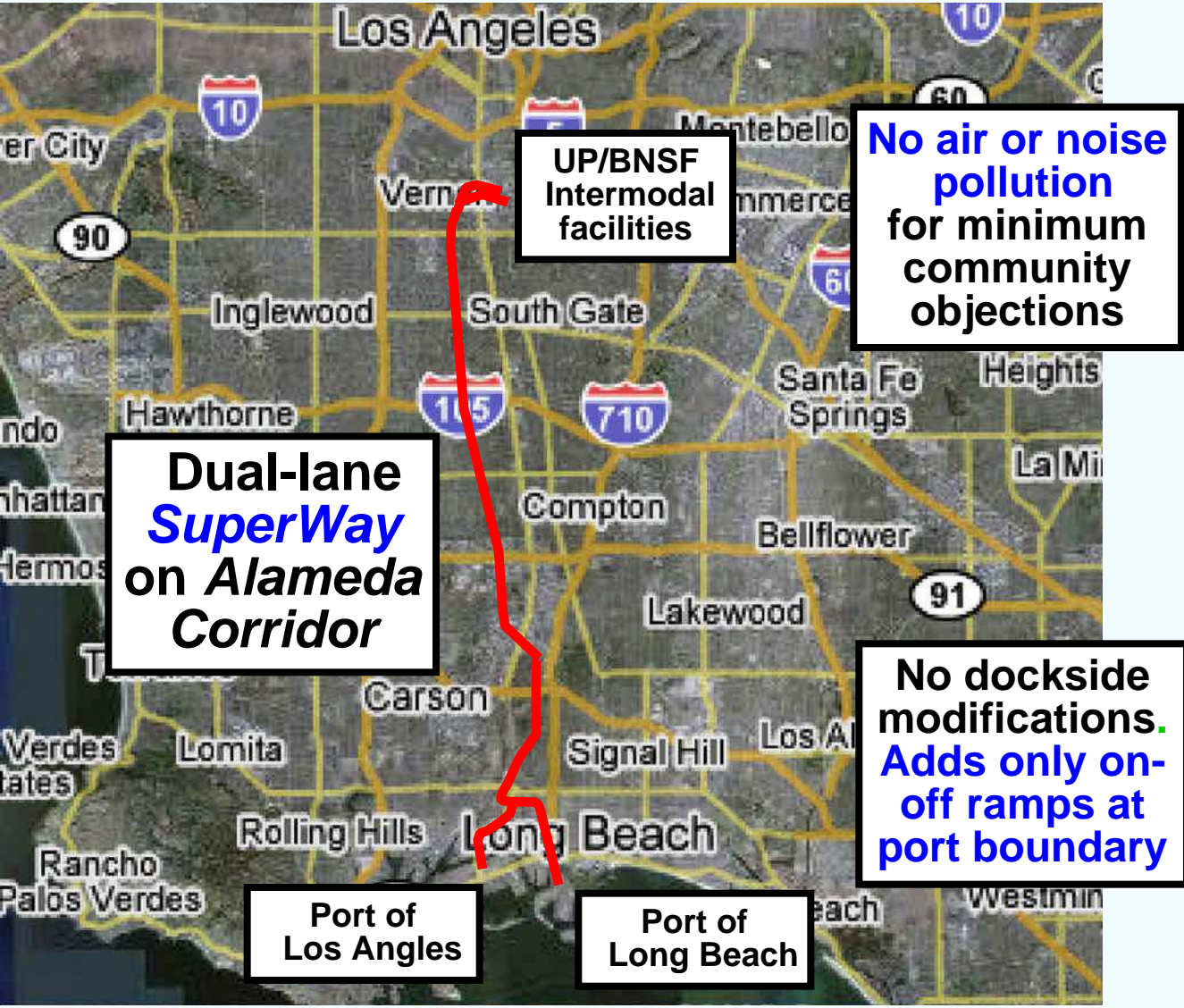
## ACTA or MTA could solve problem

- Port responsibility ends at port boundary
- **ACTA & MTA have charters and funding authority**
  - URS was contracted to identify solutions
  - Study identified six possible alignments
    - UPRR corridor
    - LA river corridor
    - Alameda corridor
    - Metro Blue Line Corridor
    - Transmission Line Corridor
    - I-710 Corridor
- **CargoWay** – only solution that can be profitable
- **SuperWay** ramps can allow SCIG & ICFT access

**Public or public-private-partnership opportunity**

# Container Truck Traffic Solution

*No impact on I-710!!!*



# Line also offers ICFT/SCIG access

Dualmode *CargoTrams* access both LA & LB ramps



- *CargoTrams* access *SuperWay* ramps for both ports
- Access ICFT & SCIG facilities via *SuperWay* ramps
- *CargoWay* would eliminate ICFT & SCIG truck problem

## ***CargoWay* Total 75-mph ROM System Cost**

- **Total Installed *SuperWay* Cost – \$283M**
  - Typical 20-mi dual guideway = 40-lane-mi \$6M/mi = \$240M
  - Likely cost for street/*SuperWay*/river spans = \$43M
- **Total Carrier Cost – 469\* x \$475,500 = \$223M**
- **Other Cost \$40M**
- **Risk \$109M**

**Total *CargoWay* System Cost = \$655M**

**Lowest cost solution to Truck Problem**

**\*Fewer carriers than trucks needed because of higher avg. speed**

**Based upon 2009 LA-MTA 3,000 40-ft containers/day**

# Public-Private Partnership is Good Investment

## Option 1

- 20-mi, Two-way *SuperWay* – 75-mph Speed
- Cost / Container Now – **\$200**
- *CargoWay* O&M Cost / Container – **\$25** (*\$175 earnings*)
- Public - **\$393M** revenue bonds, Private - **\$262M**  
( Private operation for 45 years )
- **IRR & NPV** – Based on 3,000 containers/13-hr day – 360 days/yr
  - 10% discount rate, Earnings, 20% public, 80% private
  - \$655M system cost – 60% public – 40% private
- 10yr - NPV = \$21M, IRR = 11.4, public = \$108.5M
- **15yr - NPV = \$179M, IRR = 16.4, public = \$217M**

# Public-Private Partnership is Good Investment

## Option 2

- 20-mi, Two-way *SuperWay* – 75-mph Speed
- **Cost / Container Now – \$200**
- *CargoWay* O&M Cost / Container – **\$25** (\$175 earnings)
- Public ROW, **\$655** revenue bonds, Private - **\$100M**  
( Private operation for 45 years )
- **IRR & NPV** – Based on 3,000 containers/13-hr day – 360 days/yr
  - 10% discount rate, earnings 40% public, 60% private
  - \$655M system cost – 100% public, private 100M startup cost
- 10yr - NPV = \$18M, IRR = 18.8, public = \$233M
- **15yr - NPV = \$180M, IRR = 23.3, public = \$466M**

# Low Cost and Self-funding

Revenue Bonds - No State or Federal Tax Dollars

- Revenue Bonds can Fund Construction
- No Federal Action or Funds
- Bonds Retired from Revenue, O&M from Revenue
- Public Revenue from ROW Use & Revenue Sharing  
( Public can be ACTA, MTA, etc. )
- Lower cost and faster service to customers
- Keep Ports Competitive – Allow Growth

Low Risk, No Cost to Taxpayer Solution!

## Benefits

**Solve critical truck, rail and port capacity problems**

- *Reduce Major Air Pollution Source – Heavy Trucks*
- **Costly I-710 Mods Avoided** – Plus provides revenue
- **Increase Highway/Street Capacity for other Traffic**
- **Decrease Highway/Street Maintenance Cost**
- **Increase Highway/Street Safety & Reduce Delays**
- **Increase Port & Railroad Capacity**
- *No dockside or Intermodal facility modifications*

**All this with a system you can afford!**



## ***CargoTrams* vs Low-emission Trucks**

- 3 or More Times as Many Containers per Load
- **40% or More Throughput & *No I-710 Mods***
- **60% or More Fewer Drivers** – Cuts Labor Cost
- ***Eliminates Container Trucks to Intermodal Center***
- **No Change in Dockside or Intermodal Operations**
- All-wheel Steering for Less Turn Space

***CargoTrams* can also enter & exit at ramps along line to reach warehouse districts via city streets as low-pollution tandem trucks**

# ***CargoTram*** is ***Low Risk***

**Current prototype project offers full function demo**

- **No new technology required\*** – All standard hardware
  - Side power delivery – *Inside enclosed wheelway tubes for safety*
  - *Backup mechanical steering*
  - Heavy-duty electric power steering actuators
  - Side reference bar steering proven in other applications
  - Heavy-duty, flat-free truck tires
  - Permanent-magnet hub motors – Electric bus type

\* Patented combination

**The Low Risk, Low Cost Choice**

# Suggested Action

## Contract for low-cost demo project

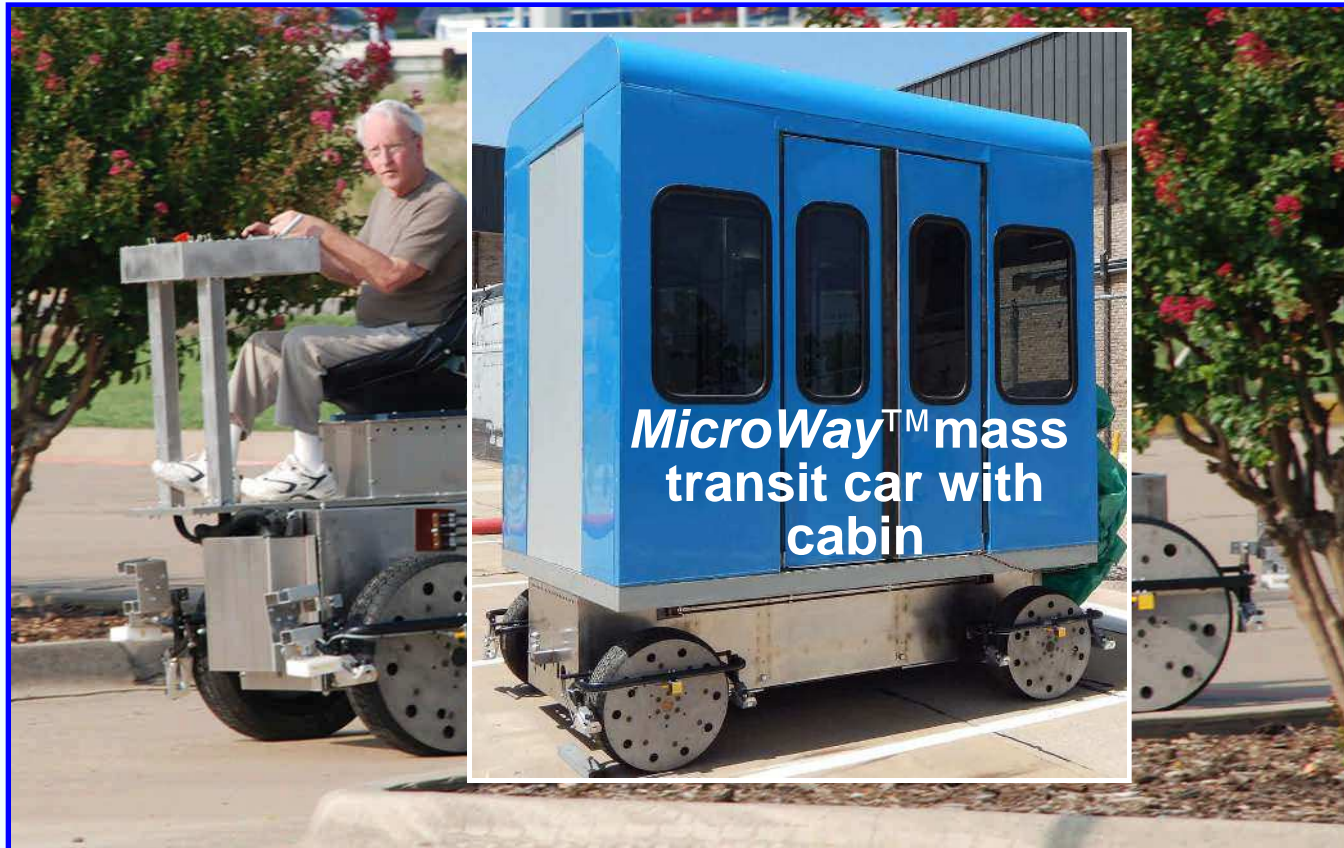
- Build & Install 1/2-mile demonstration *SuperWay*
- Build single, three-carrier dualmode tram
- Demo to prove ground & rail operation
  - Full demo in Fort Worth
- Complete demo project in twenty-six months
- Total demo project cost – \$20M

## Low Risk, Low Cost Project Proves System

Contract ROAM for concurrent final alignment  
& initial site engineering study – Cost TBD

# Prototype Test & Demo Vehicles

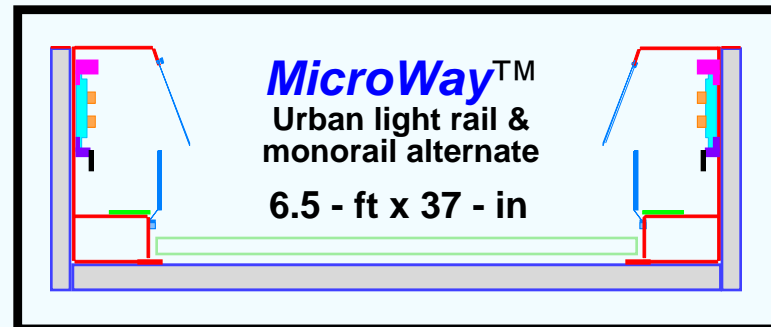
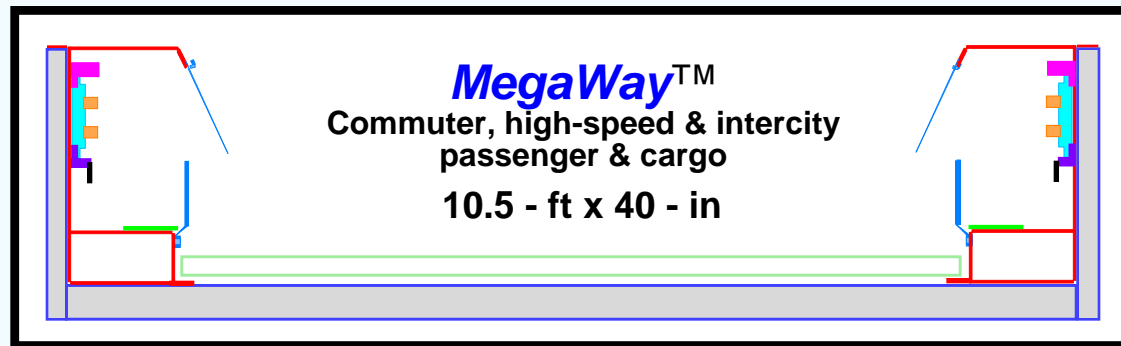
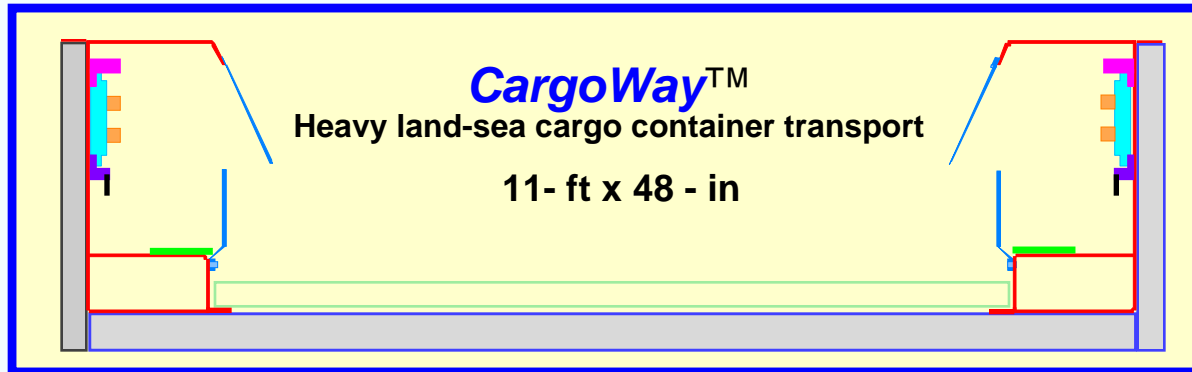
Road and *SuperWay* tested



Hybrid dualmode car chassis unit in test & transit demo car  
( Dualmode version operates both on *SuperWay* & streets )

**Not just a “paper” system – It’s real and here!**

# CargoWay™ - One of Family of Systems

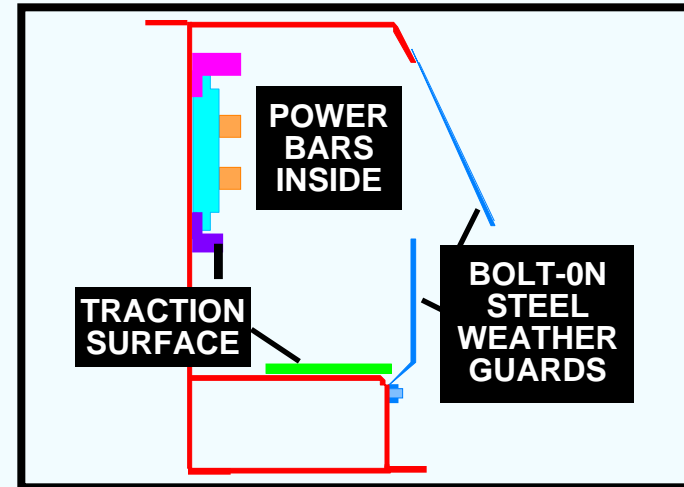


Prototype tested

# Low-cost, All-weather, Enclosed *WheelWays*

- Low-cost *WheelWays*

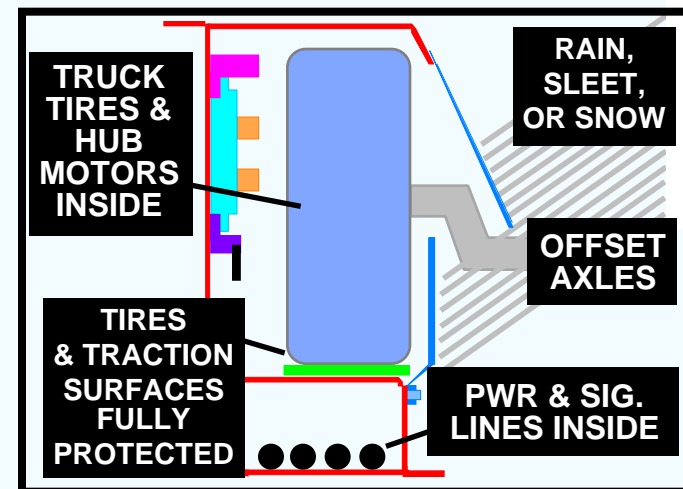
- Parts cut from flat steel
- Machine-welded construction
- Low material & labor costs
- Bolt-in electric power bars
- Truck guideway sections to site



Single wheelway cross-sections

- All-weather, *WheelWays*

- Wheels & power collectors inside
- Protected electric power bars
- Dry & ice-free traction surfaces
- Safe operation in any weather
- Whisper-quiet operation



*WheelWays* & cross-members form self-supporting “U” structure

# Attractive, *Low Profile* Stainless *SuperWay*



Guideways elevated above street & pedestrian traffic - *MicroWay SuperWay* photo  
**Minimum sky blockage – No wide elevated conventional train shadows**



U.S. Patent 6,837,167

# Technology Summary

**Unique, patented new combination of proven technology (8 patents)**

## Enclosed stainless-steel wheelways - US Pat. 6,039,135

- Simple welded steel factory fabrication
- Standard power rails

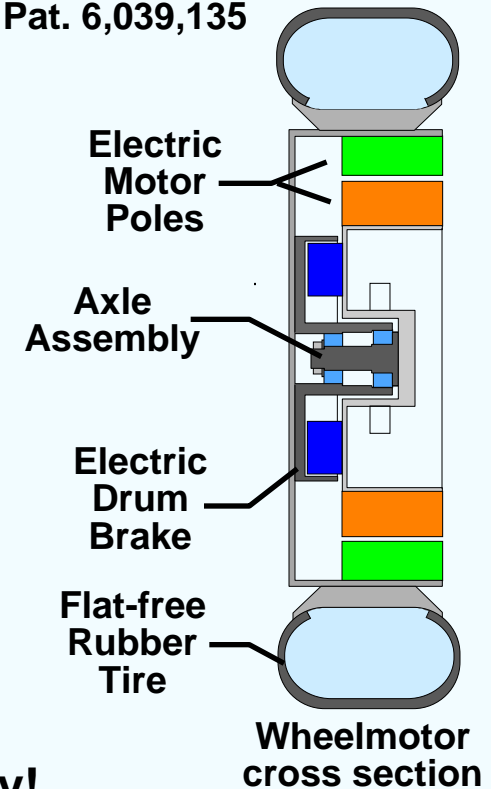
## Flat-free tires – Current technology

## Permanent-magnet electric motors

- Current commercial motor technology
- Electric motor wheels – Some electric cars

## Car-based steering & switching

- Smooth non-contact electronic steering
- Switching – By cars as on conventional freeway!



***Only the combination & SuperWay are new!***



# Summary

## Performance – Beats heavy trucks or any other system

- Up to 5,000 containers per hour per direction
- Shorter trip times • Truck-type hill capability
- No dockside modifications – Dualmode trams operate as trucks

## First service – Within 30 months! – ( Train-type manual control )

- Local & State Funding – No Federal funding delays

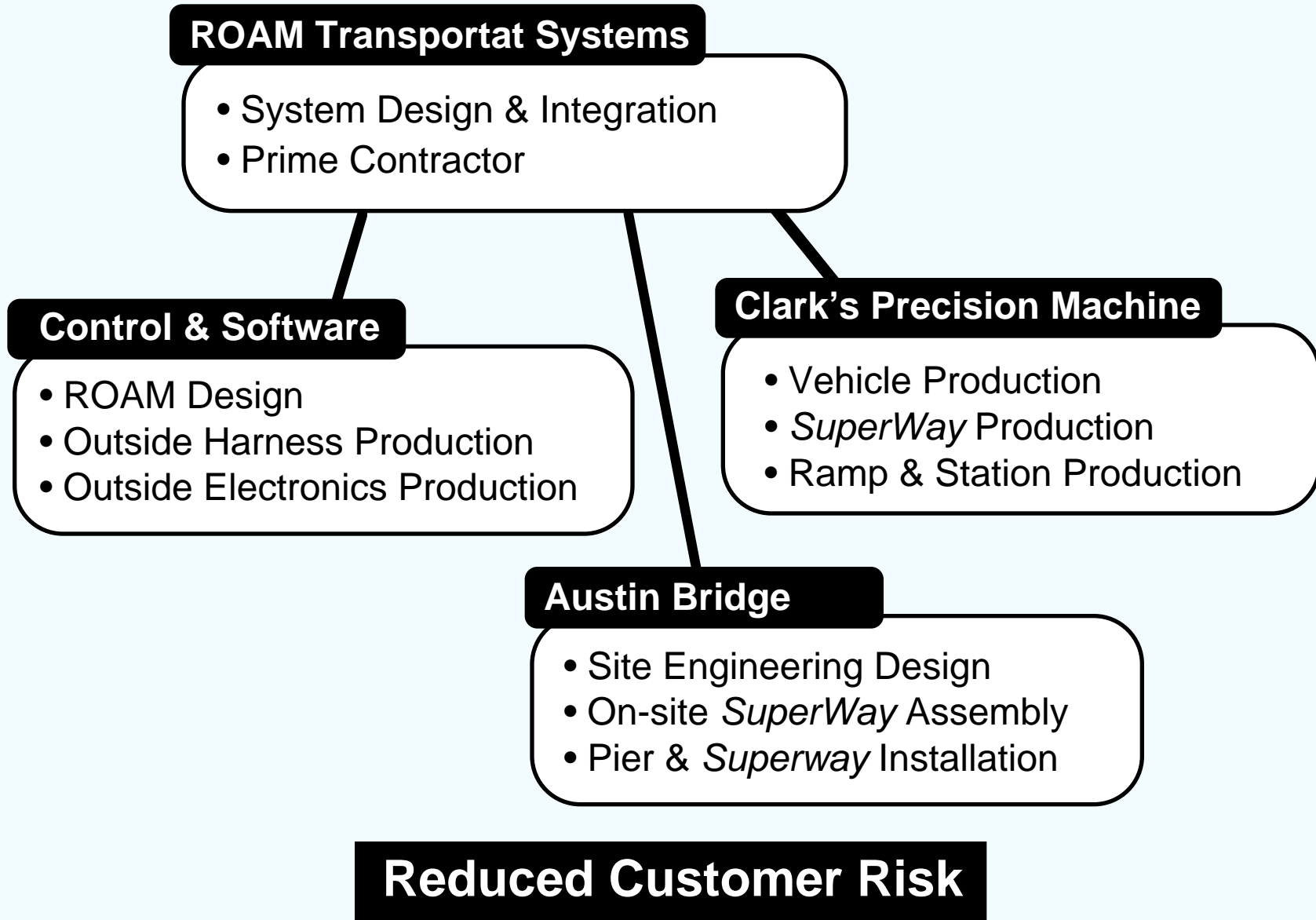
## **SuperWay** cost – \$6 – 10M per lane-mile (Typical installed cost)

- Local funding and control • No on-going operation subsidies

## Environment friendly – *Low emissions*

- No construction or operation impact to business or traffic
- No earth moving • No added right-of-way • Noise free!

# Proven Industry Team





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## Revolutionary, High-speed, Multi-user 21st Century Transport!

- *Unprecedented* level of service
- Low transportation user costs

**Near-term & affordable solution to  
traffic & air pollution problems**

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# Cost Backup



## Why **CargoWay** cost is so much lower than other elevated systems

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# Fixed Guideway System Higher Cost Roots

- **Most use linear motor propulsion**
  - Expensive copper motor windings for length of guideway
  - Low efficiency = More power – Large inter-pole gap size
- **Most use large moving guideway switches**
- **Most use longer guideway spans**
  - Leads to more massive & expensive guideway beams
- **Some use maglev support systems**
  - Complex & expensive suspension control systems
- **Extensive guideways required at terminals**

# Key *CargoTram* Low Cost Features

- **Simple electric wheelmotor propulsion**
  - Small inter-pole gaps for *high efficiency & low power*
  - Simple & low-cost all steel super-freeeway
- **Short (50-foot), factory-built *SuperWay* spans**
  - Leads to *less massive and less costly* freeway beams
  - Highly automated fabrication for low labor content
- **Ordinary heavy truck tires & air bag suspension**
  - No complex suspension control systems
- **Vehicle-based switching – *No moving guideway***
- **Dualmode trams – *No guideways in terminals***

# Why *CargoTram SuperWays* are Low Weight

- Lightweight *CargoTram* Carriers

- *CargoTram* single carrier max gross weight – 75,000-lbs
- *CargoTram* carrier length – 50-feet

50-foot long freeway sections

*CargoTram* max *SuperWay* load – 1 carrier x 75,000-lb

- Highly Efficient *CargoTram SuperWay* Design

- Self-supporting enclosed *SuperWay* wheelway tube design
- Wheelway tubes and cross-ties form strong “U”– channel section

50-foot long *SuperWay* sections for minimum structure size


*CargoTram* 50-ft *SuperWay* weight – only 30,000-lbs



# Low-cost *SuperWay* Production Design

Two Enclosed Wheelway Tubes Form *SuperWay*

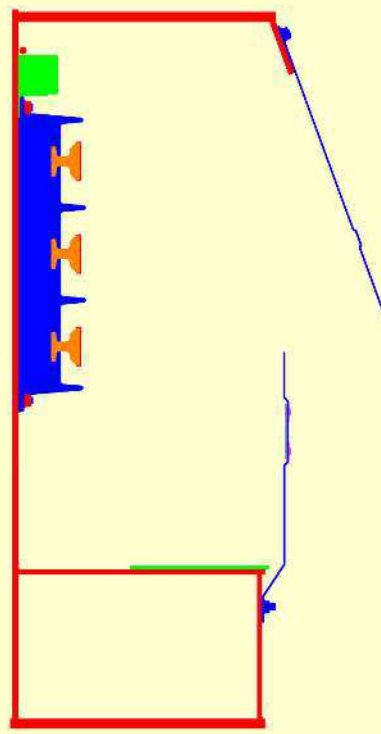
Wheelway Production Steps



6 flat parts  
plasma cut from  
stainless steel



6 flat parts  
welded at corners  
by robot welders

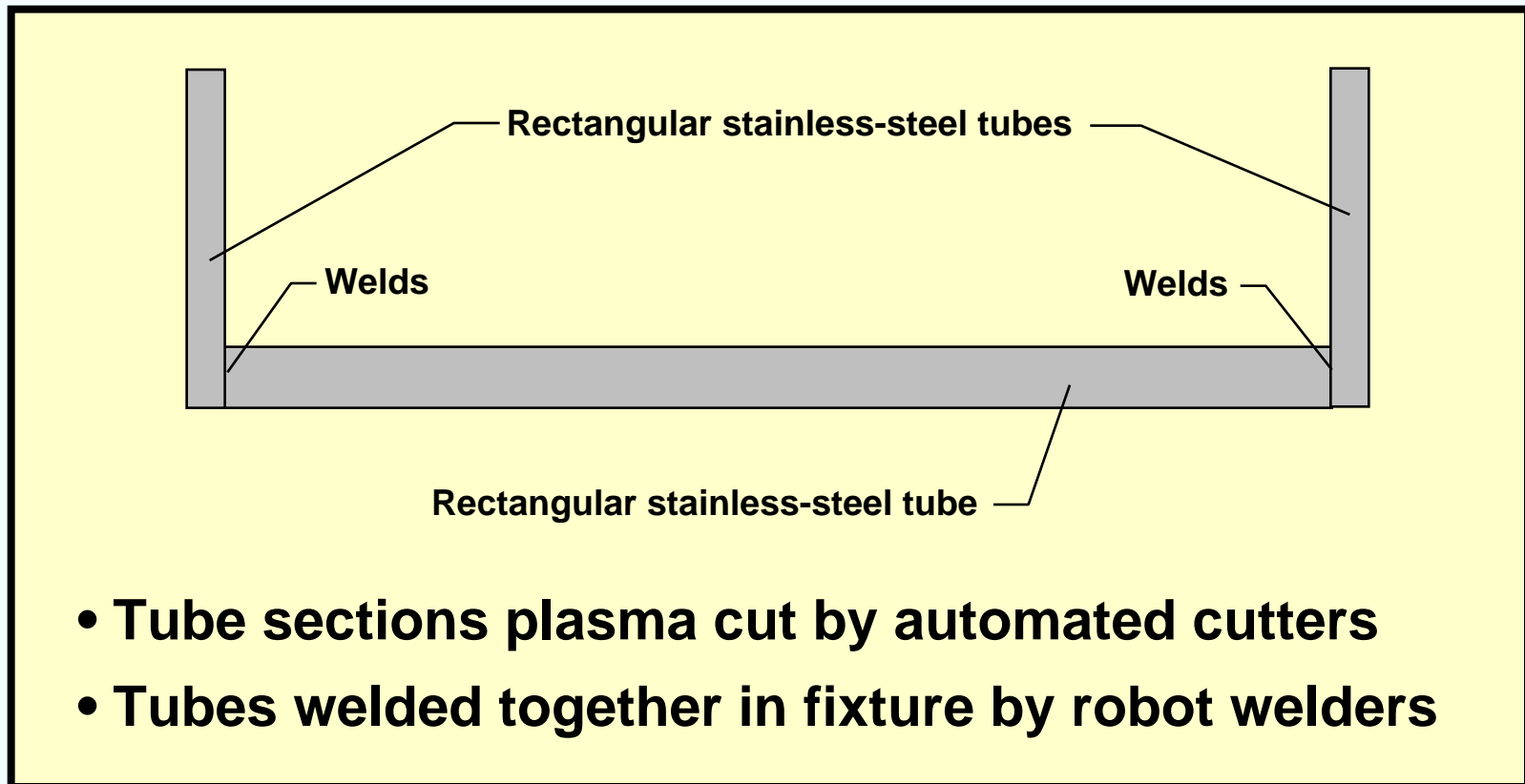


Weather guards  
traction plates &  
power bars  
bolted in place

Nine Welded-tube Cross-ties used at 5-ft intervals

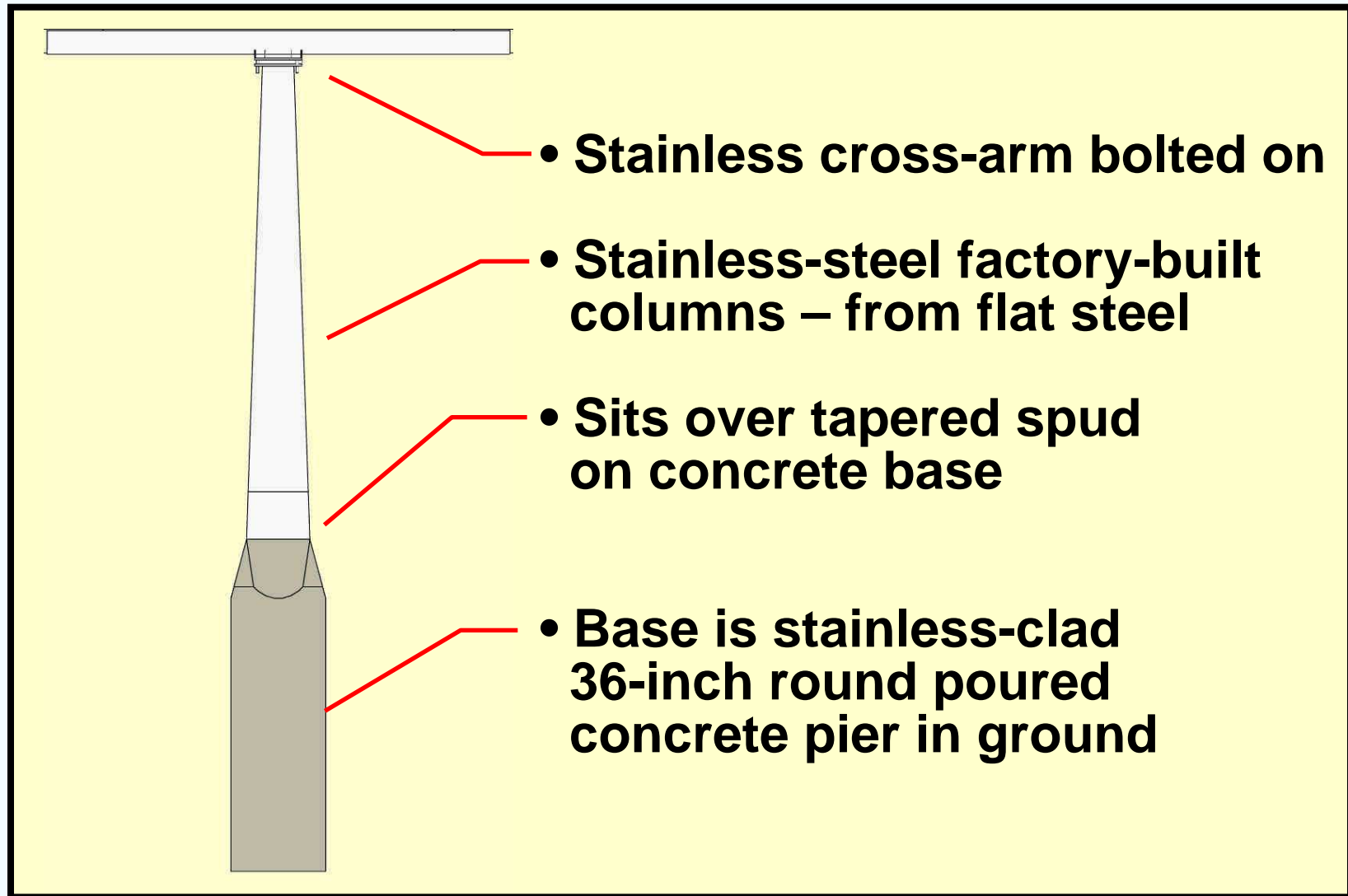
# Cross-tie Assemblies Production

## Made from welded, stainless-steel tubing



**Cross-Tie assemblies welded in place at factory**

# Ultralight, Low-cost Factory-built Columns



## **ROAM** has Solid *SuperWay* Cost Data

- **201 Stainless-steel material cost is known**
- **Firm, fixed price bids from 3 manufacturers for guideway elements production**
- **Installation costs based on current structural steel erection costs**
- **Concrete pier cost from current pier costs**

# ***CargoTram* Carriers Designed for *Low Cost***

## **Lightweight Design & Ease of Maintenance**

- **Systems in lower chassis unit for access ease**
- **All metal parts cut by robot plasma & laser cutters**
- **Most raw material is flat stainless-steel**
- **Entire structure of welded stainless sheet**
- **Empty carrier weight – 10,000 pounds**
- **Low complexity control systems**

**Carriers are light weight & low cost**

## ***CargoTram* Cost & Availability Summary**

- ROAM does design, integration & support
- Subcontractor team able to provide capacity
- Installation subcontractor (Austin Bridge) capable of all field engineering & installation
- Major subsystems from established sources
- ***SuperWay*** is 90% of cost – Firm bids secured  
We know that system costs are correct!

***CargoTram* is the lowest cost approach**



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