

# Port & Terminal Technology 2018



## Landside Automation

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May 11, 2018





# Automation Solutions & Electrical Supplier *Crane Systems*

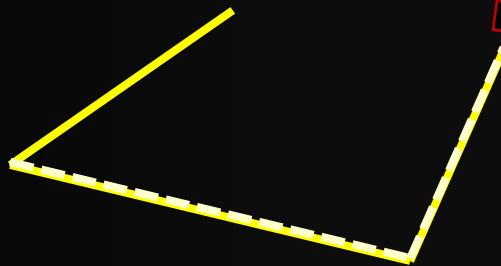
Roanoke,  
Virginia



# Transferring containers in the Landside Transfer Zone,

## How can it be done better?

Landside  
Transfer Zone



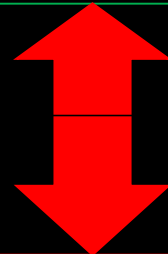
“In an automated stacking crane environment...

***‘Hang Time’*** is the wasted time between when the automated crane positions for pick-up or drop off... and when the manual remote operator takes over and completes the move.”

‘Hang Time’ **starts** when automation has positioned the crane for manual takeover, and brakes are set



?



‘Hang Time’ **stops** when the remote operator takes over and brakes release.

# Results from the study of an example semi-automated container terminal:

- Operations run **10** hours each day.
- There are 26 container stacks meaning there are **26** landside zones.
- Average Landside move takes **3.53** minutes
- Average crane performs **17** moves per hour in the landside.
- Average 'Hang Time' is **33** seconds per move.



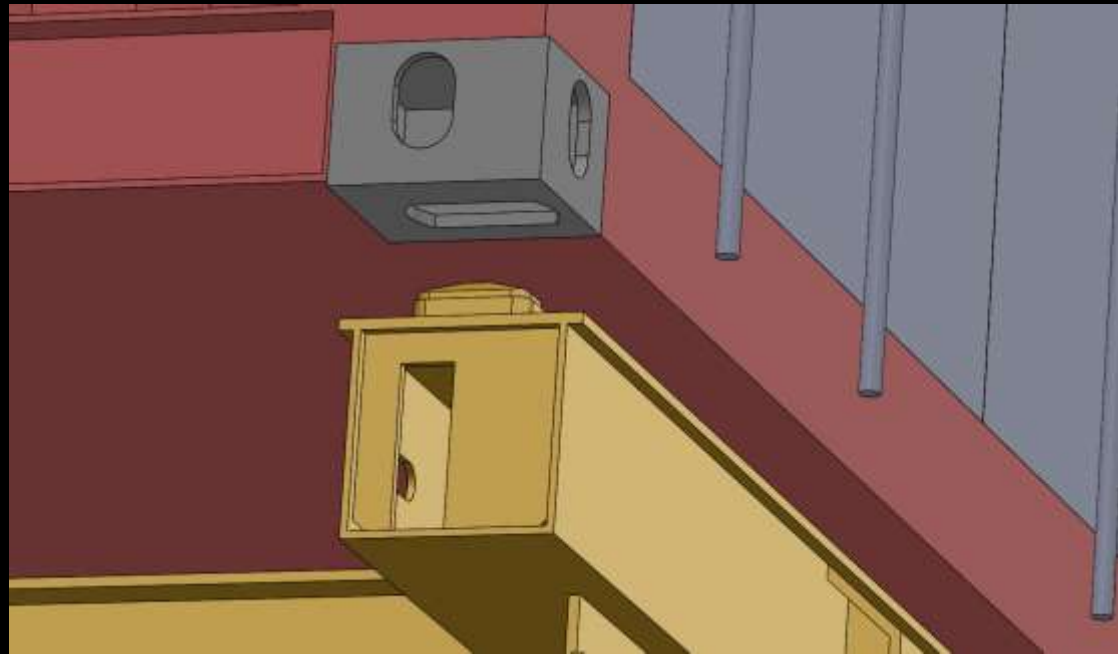
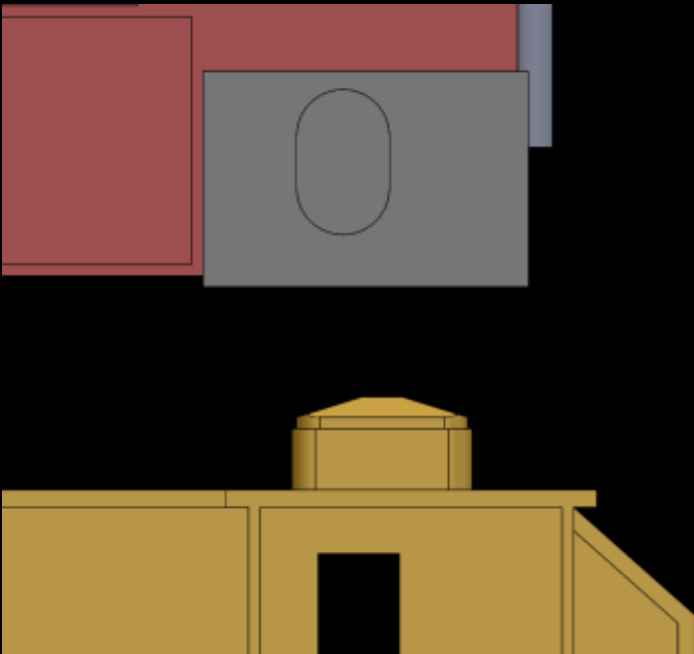
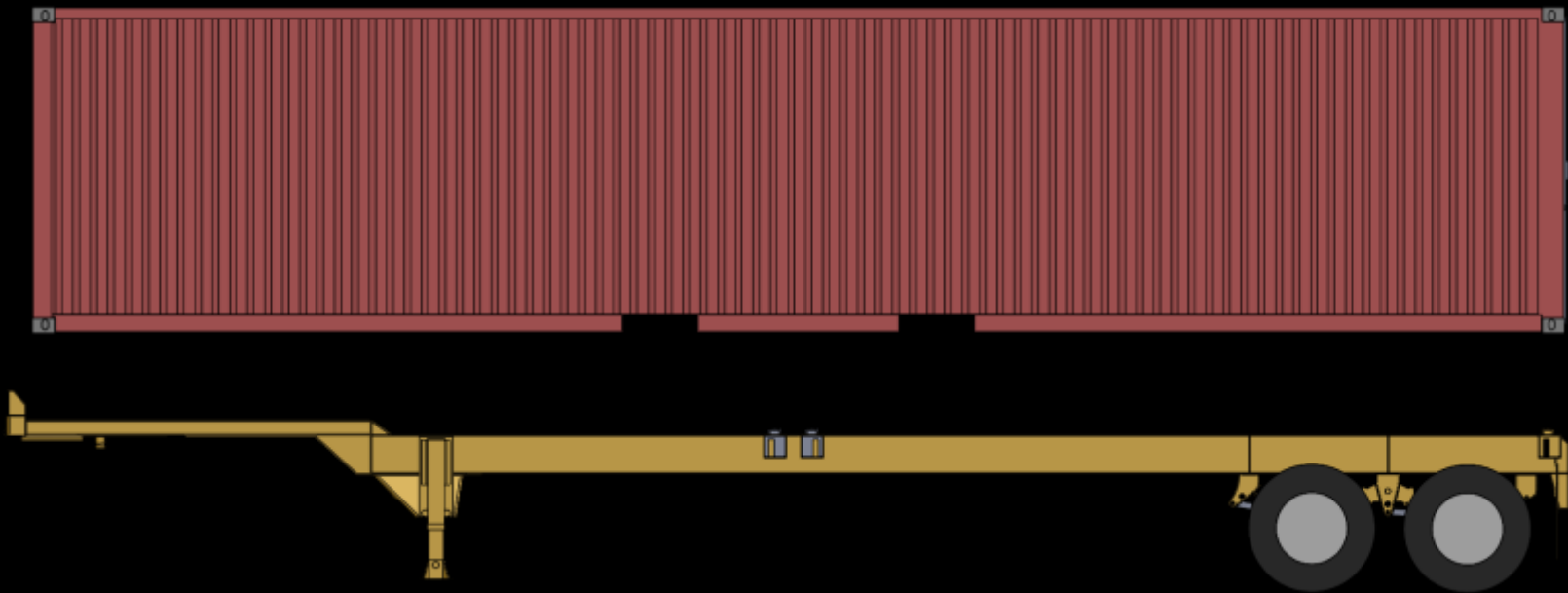
- 10 hours X 17 moves an hour =  
170 moves per day
- 170 moves X 33 seconds Hang Time =  
5,600 Seconds

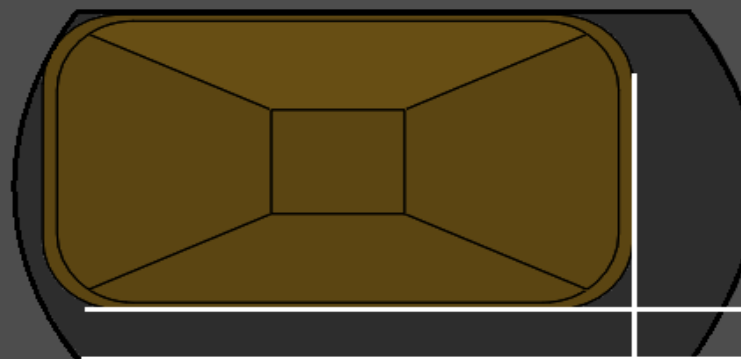
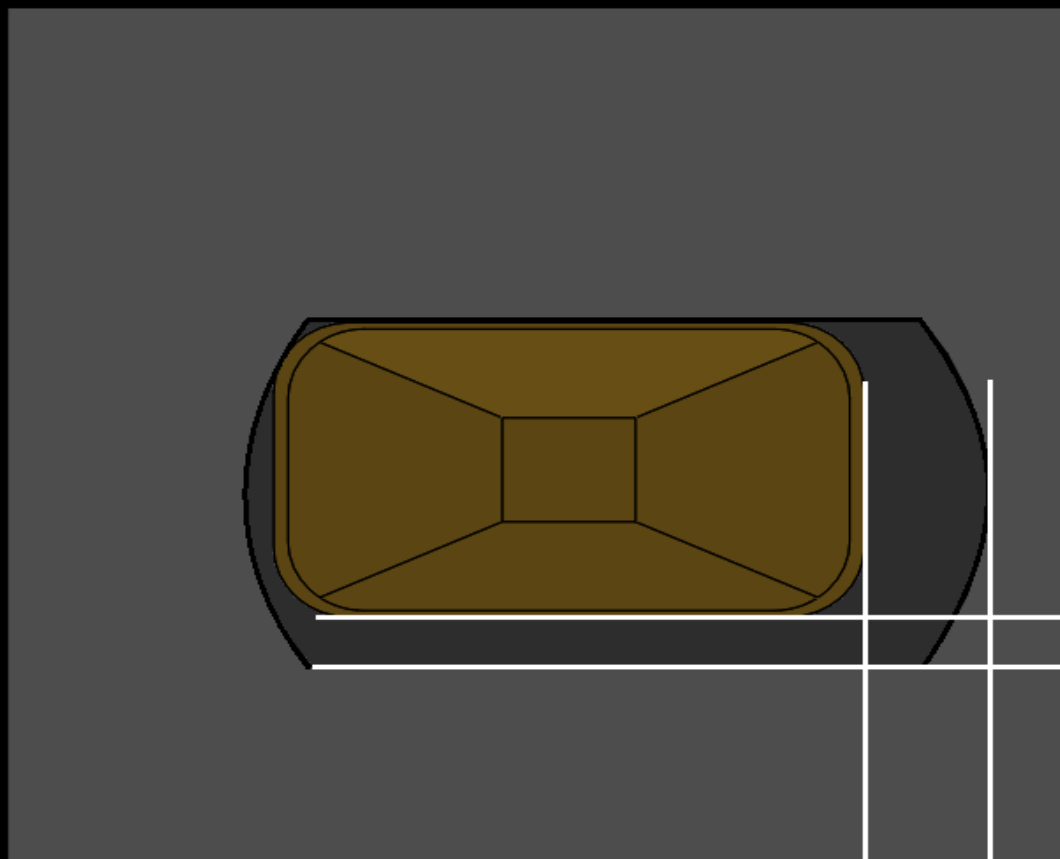
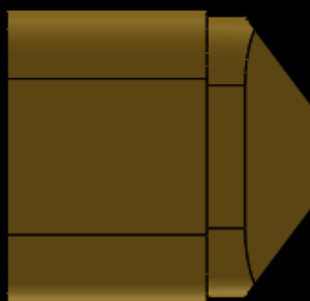
**HUGE potential for  
improvement!**

*That's 1.5 hours of  
wasted time each  
day per stack!*



# What would it take?





9.5mm

29mm

Zero Impact To Existing Automation Systems

Crane Mounted Devices Only, No Civil Work Required\*

No Civil Work = Huge Cost Savings

Minimized Cycle Time = **Reduced Truck Idle Time**

Integrates Seamlessly With Existing TMEIC  
Automation System

*High Impact Solution with Low Cost*

**TMEiC**  
*We drive industry*

# MAXview4D<sup>TM</sup>

**Introducing: Landside  
Automation**




# MAXview<sup>TM</sup>4D


Automating Interactions in Landside Transfer Zone

$$\frac{3D \text{ Data}}{Time} = 4D$$

**Accuracy of Incoming  
Sensor Data**

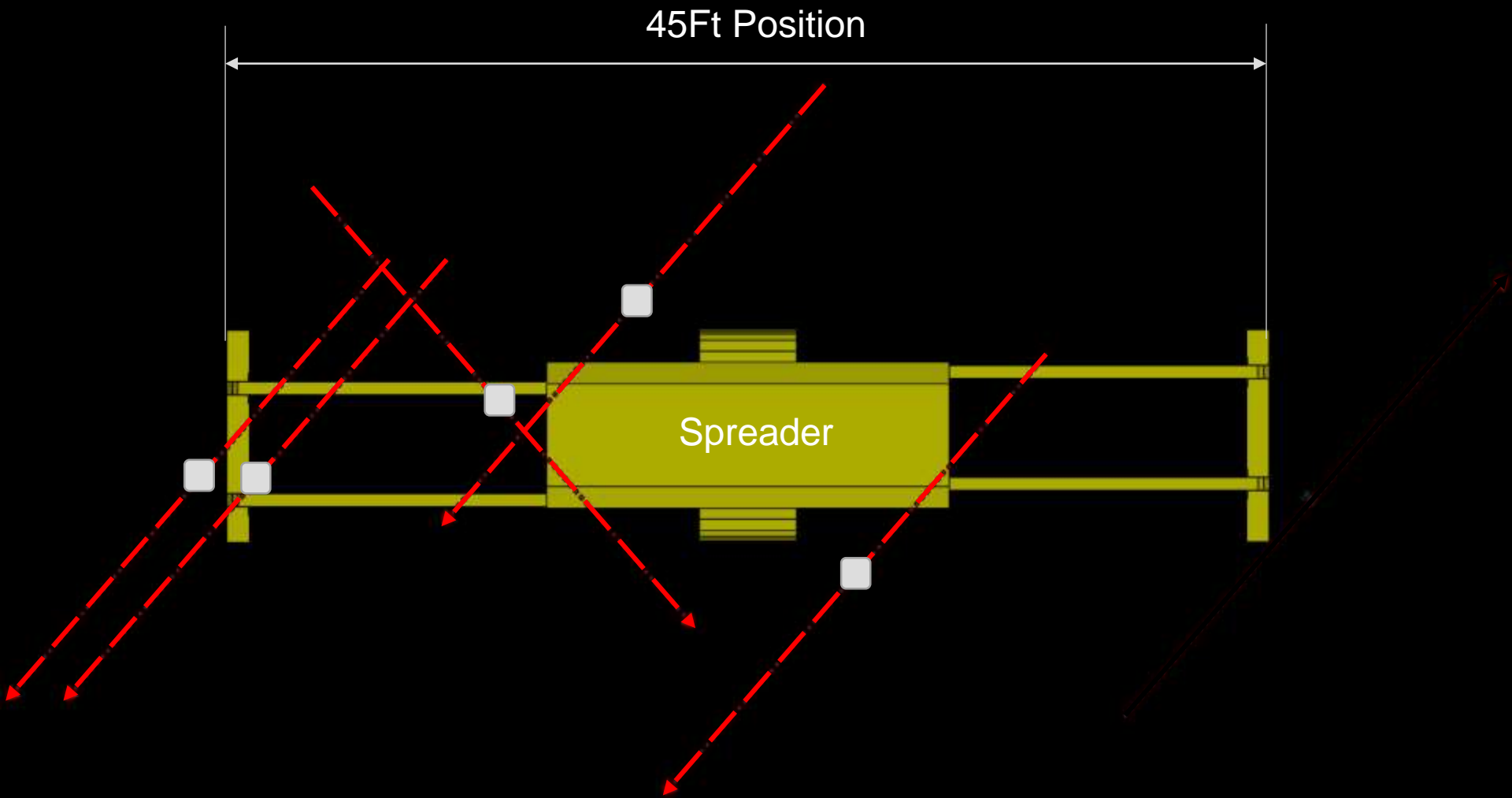


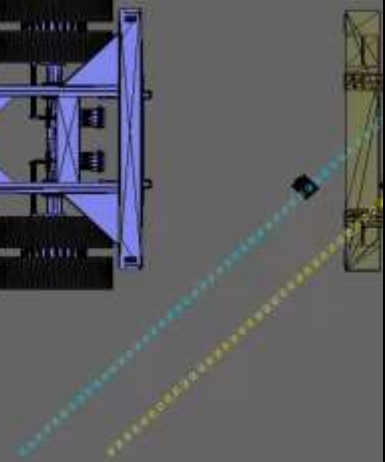
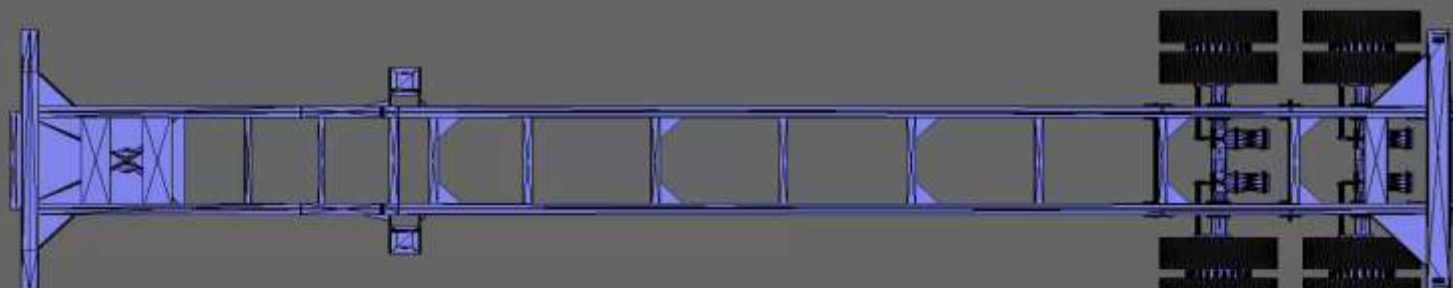
Maxview4D™ 4D Data Analytics Algorithms and  
Landing Solution Generation

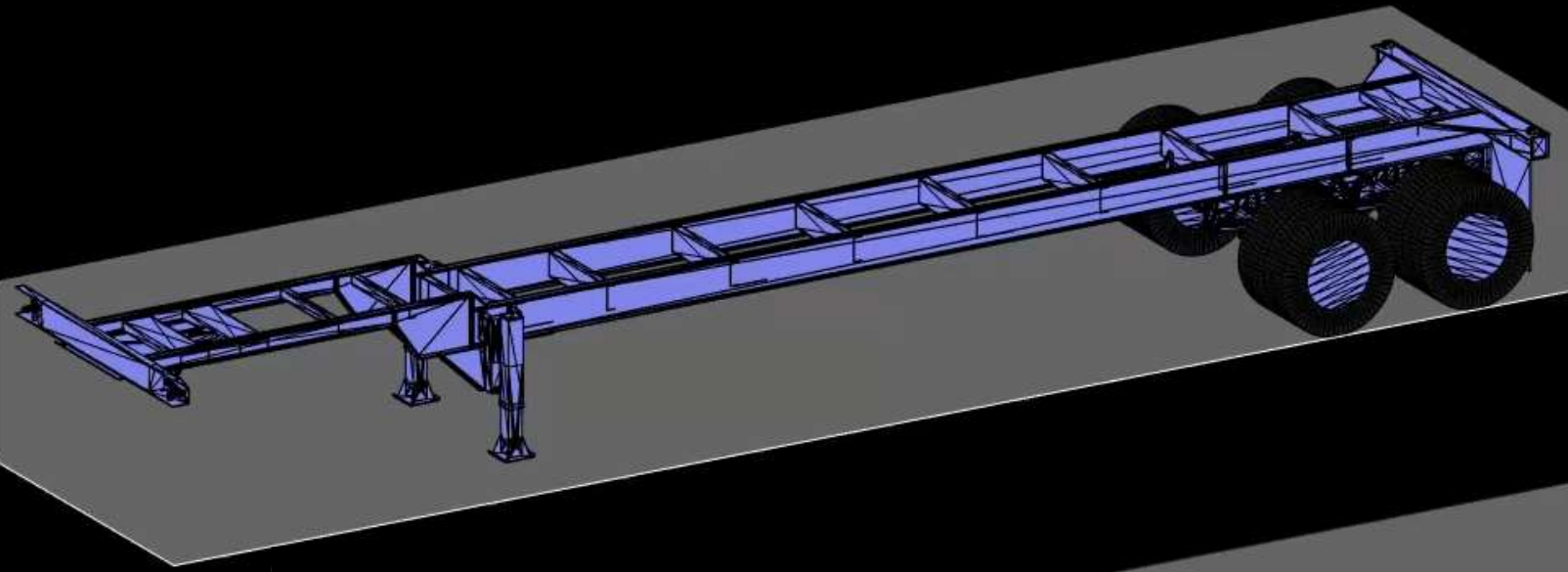
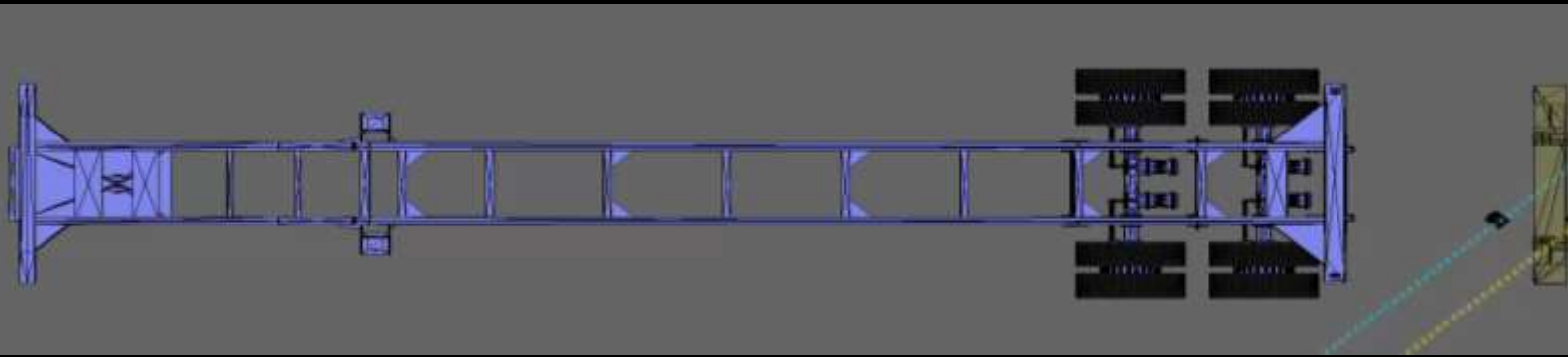


Crane Mechanics and Automation System's  
Combined **Ability to Regulate** to a Given Solution

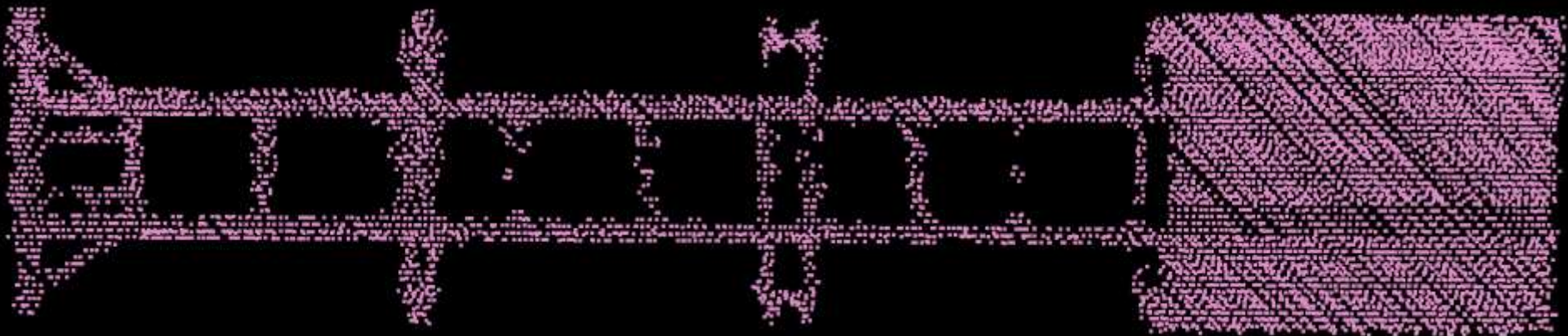




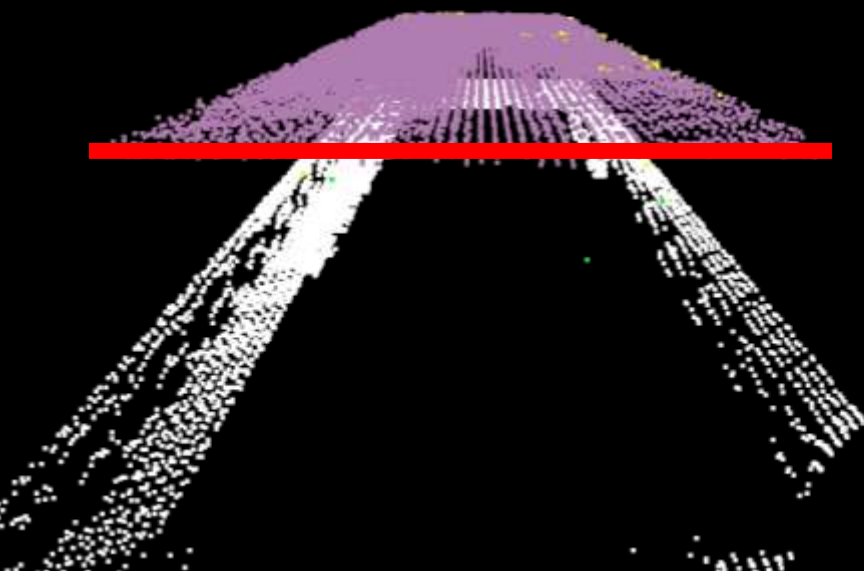




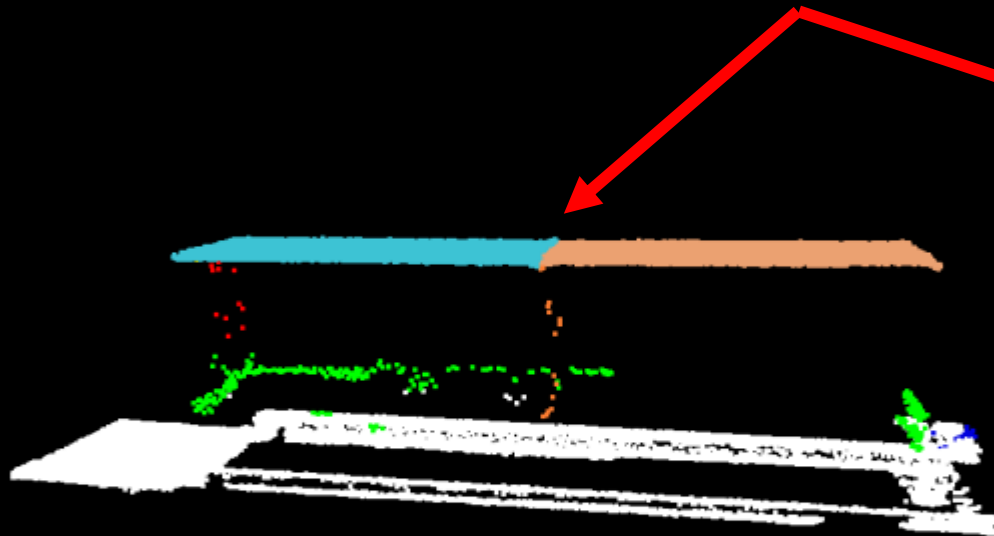








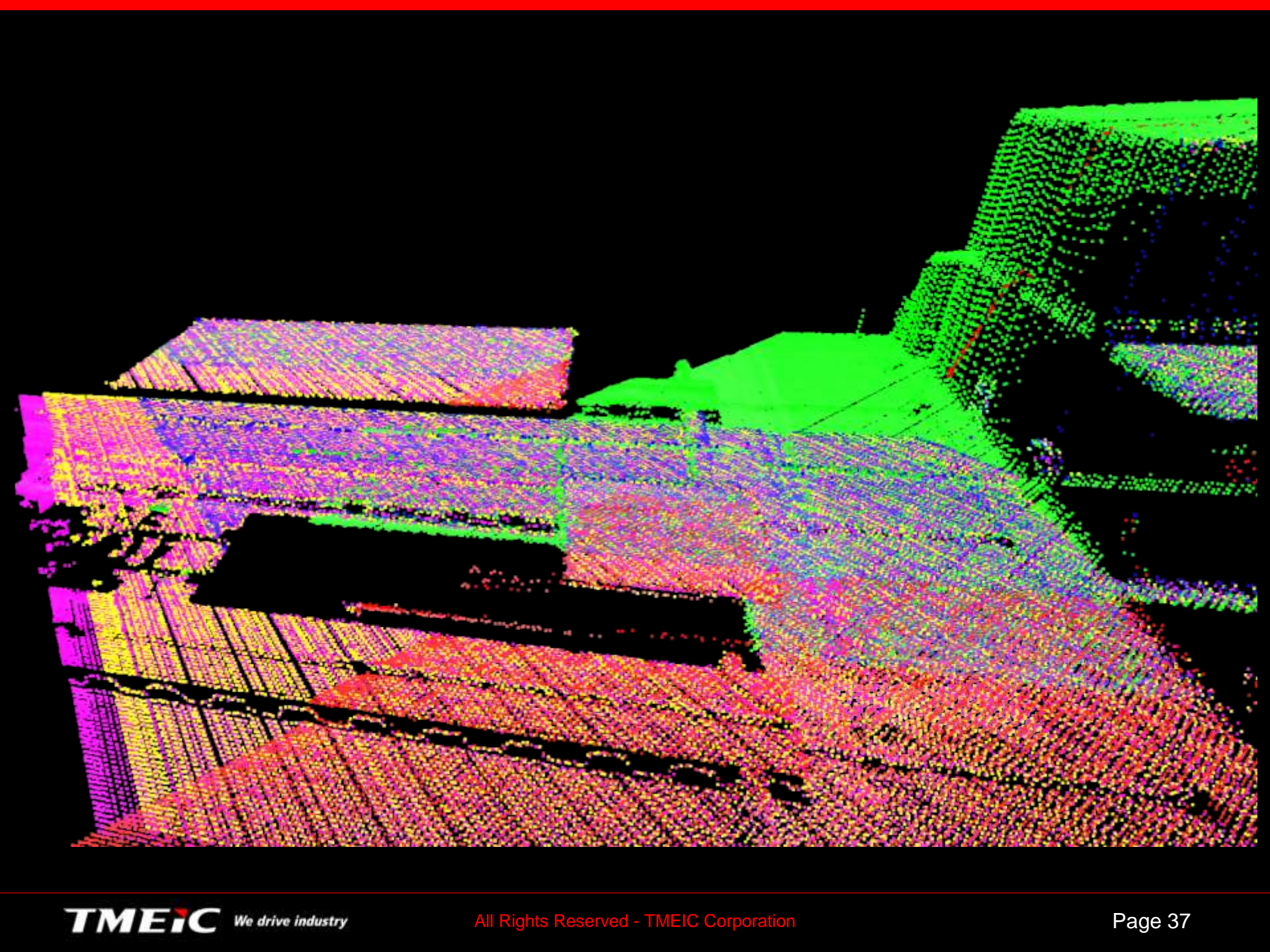
Twin Twenty Split



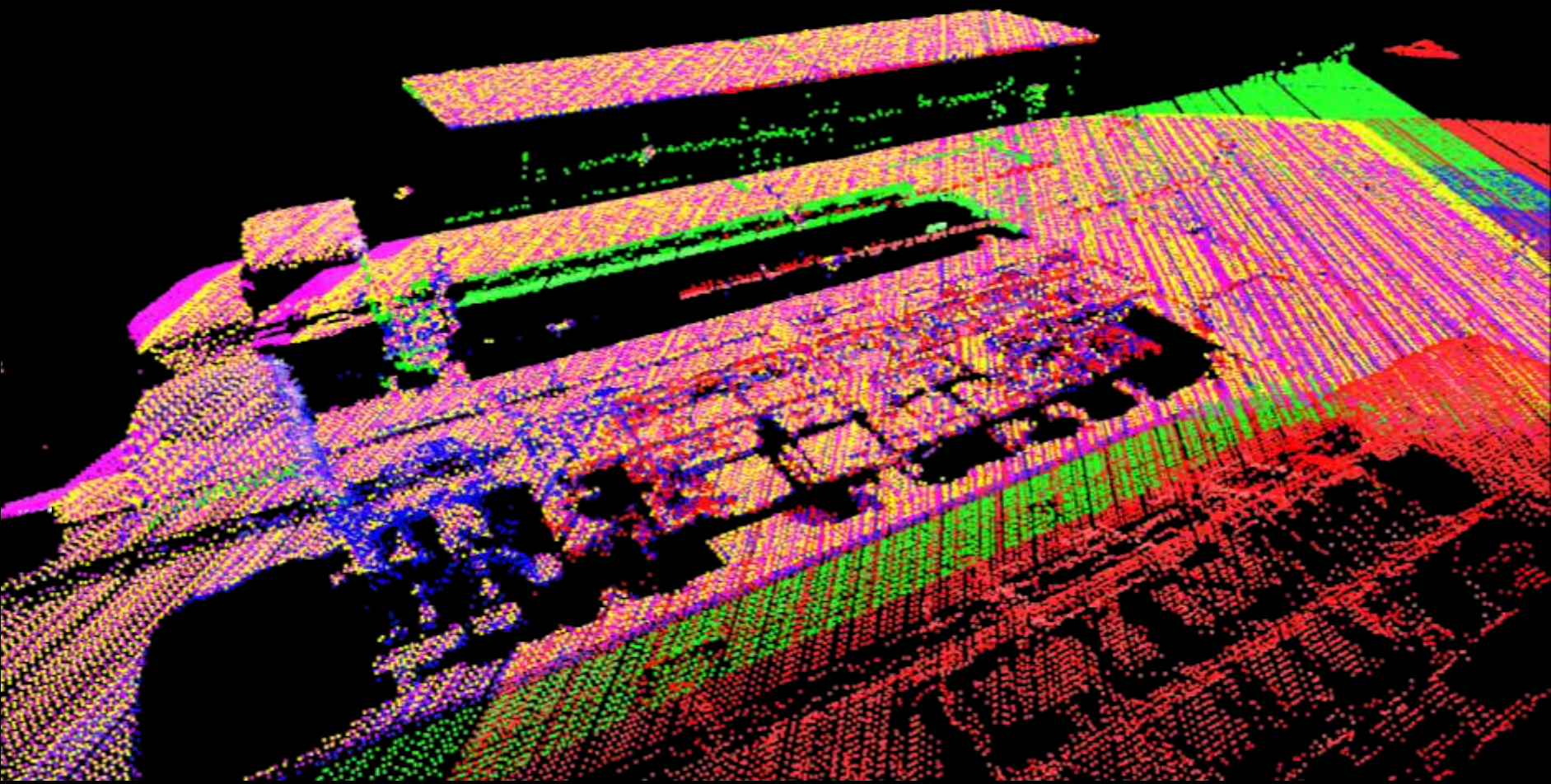


# Functional Description of Maxview4D™ Processes

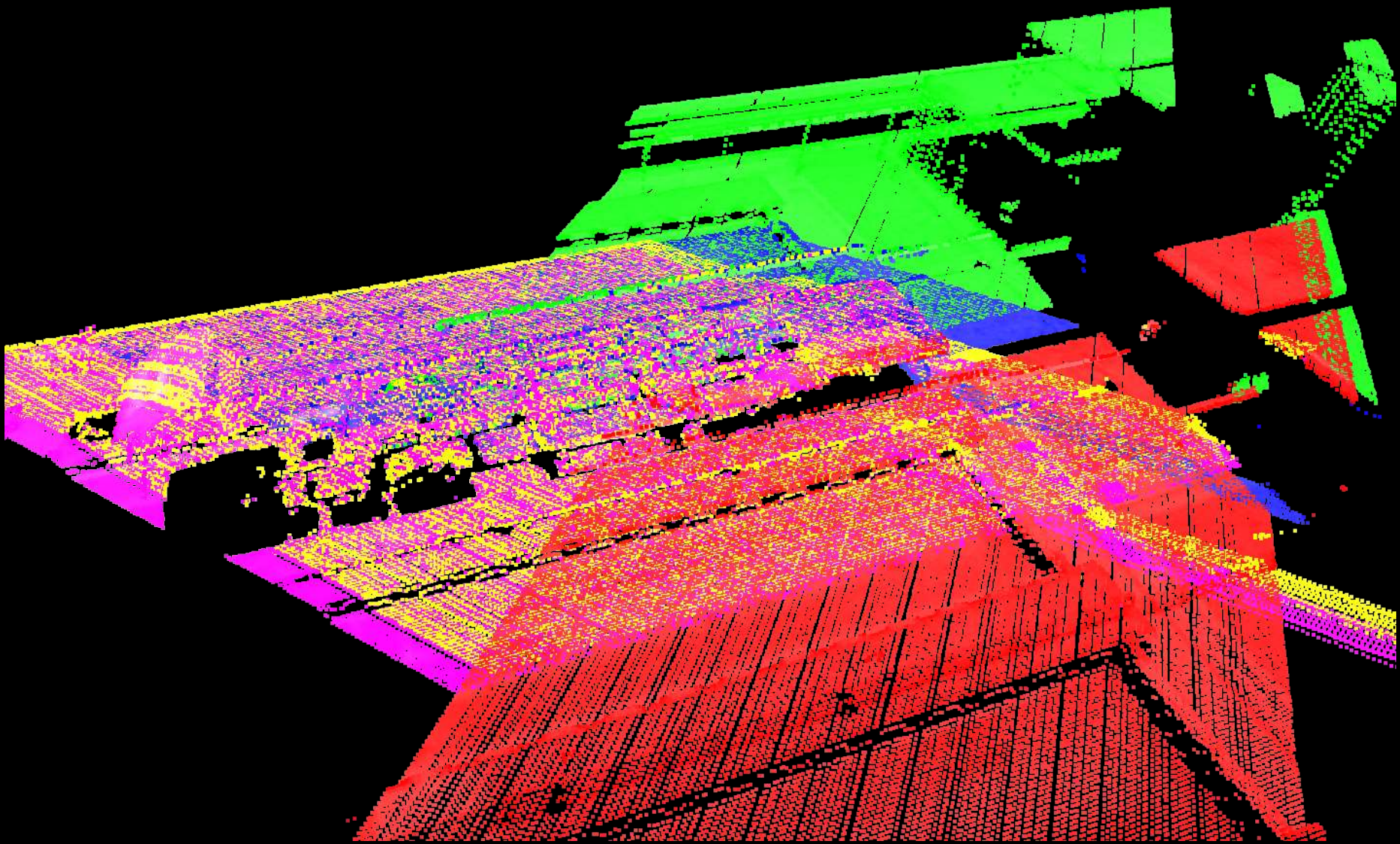
1. Data Collection
2. Scene Identification
3. Exception Checking (Bad Operation Request)
4. Target Solution Generation
5. Exception Checking (Obstructions, Bounds, Etc.)
6. Solution Handoff For Regulation

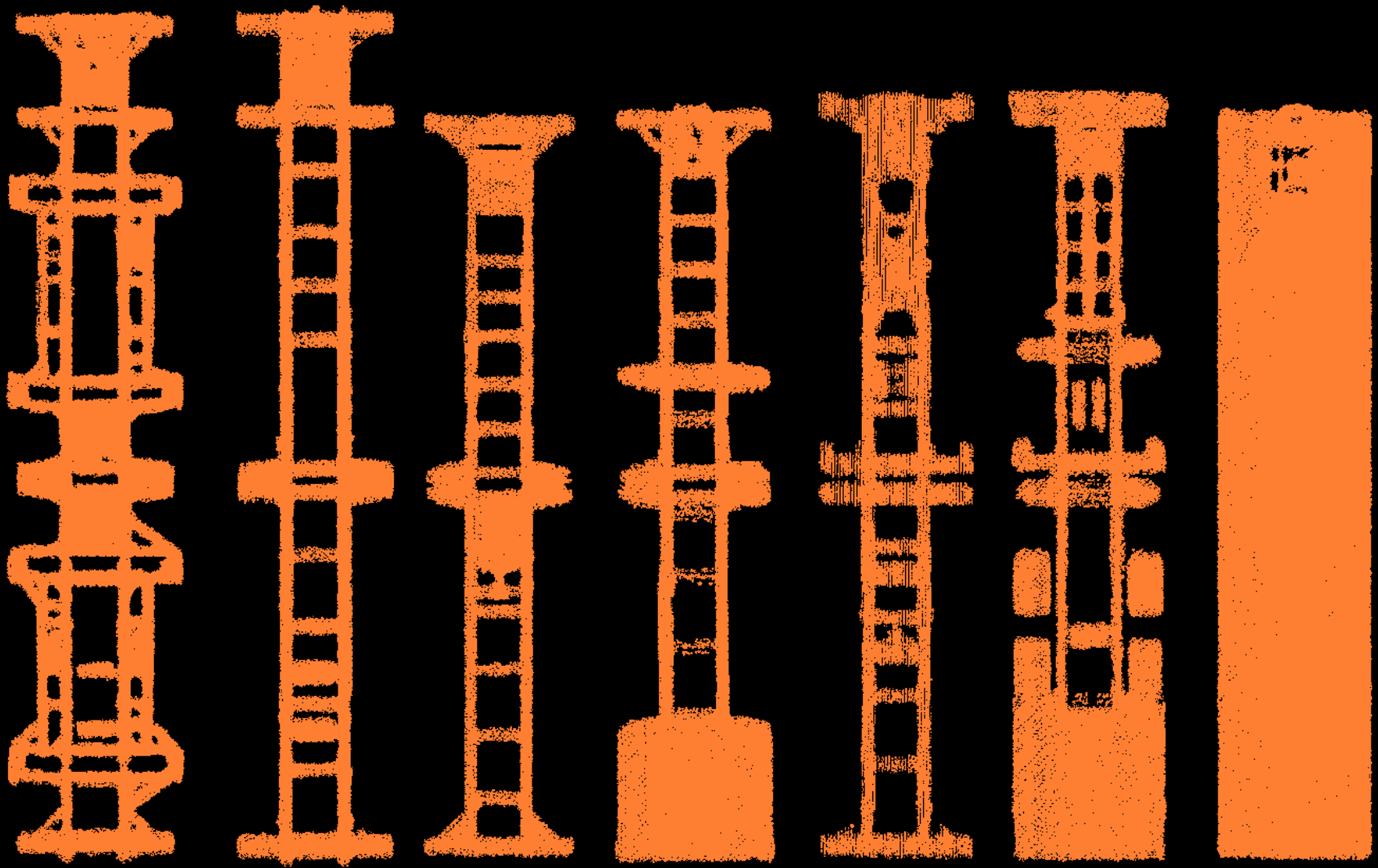


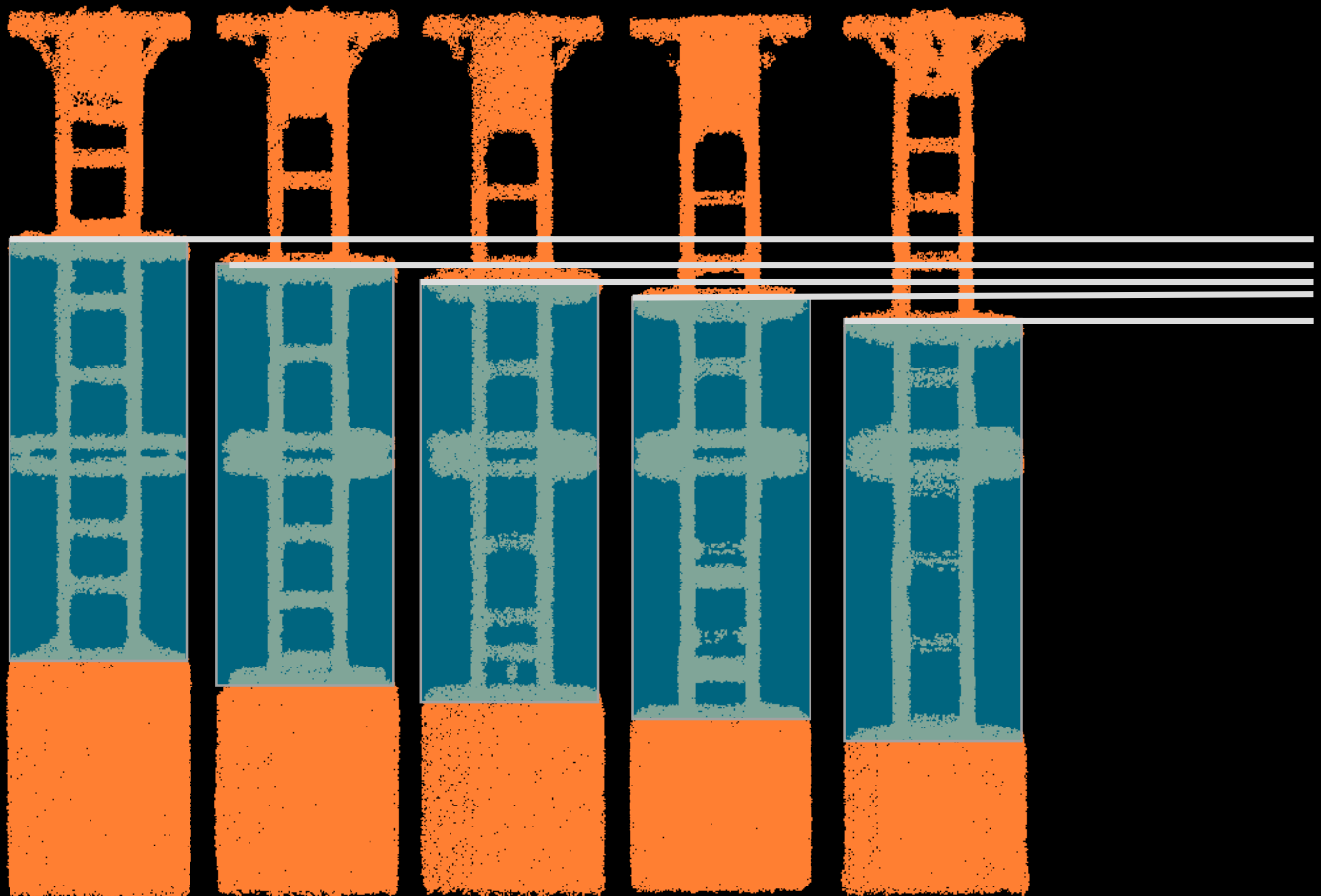




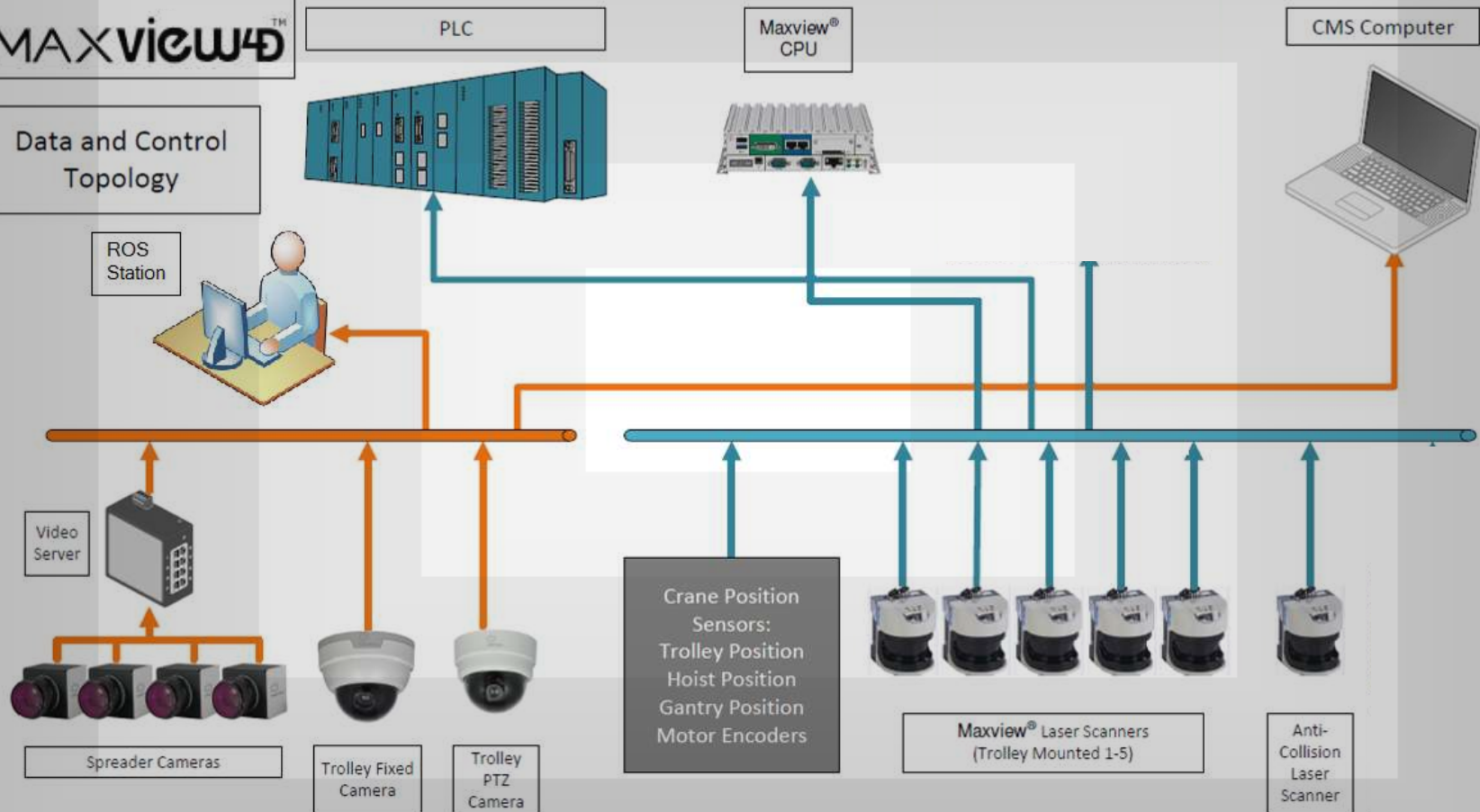








**Data and Control  
Topology**





**TMEiC**  
*We drive industry*

# MAXview4D<sup>TM</sup>

**Landside Automation  
Performance**



45' ISO Standard Containers

40' ISO Standard Containers

20' ISO Standard Containers

20' Tank Container

40' Soft Top Container

20' Soft Top Container

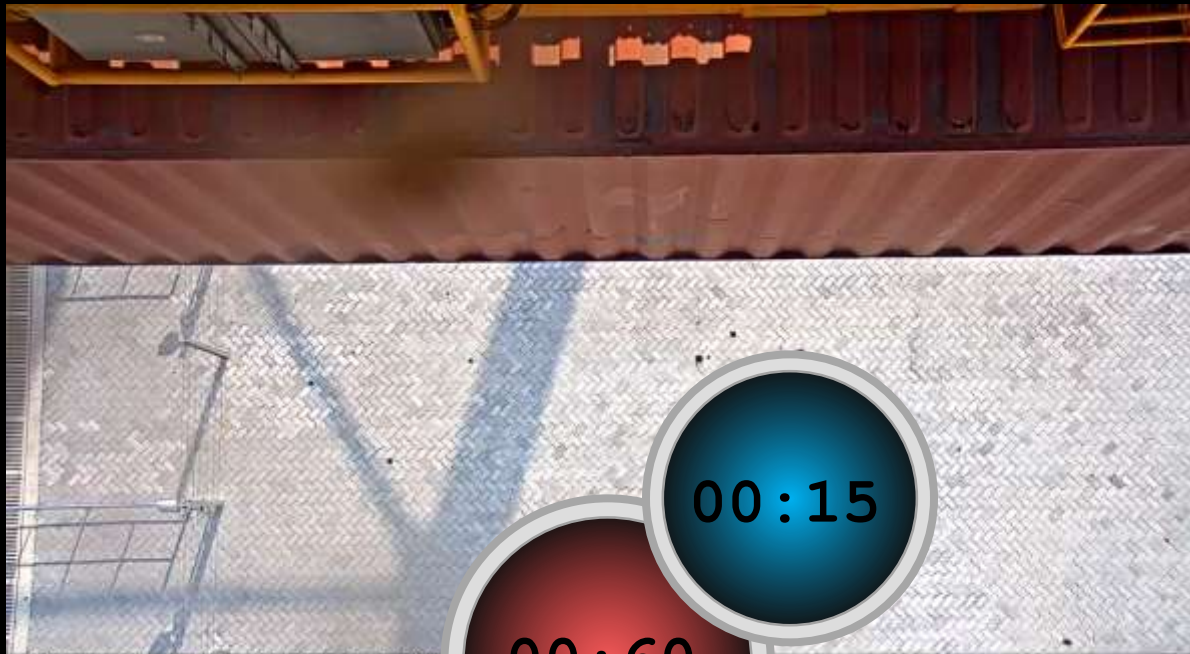
Twin 20' Containers (Front or Rear Pick)

15+ Major Styles of Chassis

Varying Levels of Chassis Quality

More than 1 year of Operation

At Multiple Locations Worldwide



AS219L Trolley PTZ 2017-04-13 15:03:40

00:60

00:15



Block19 LS Lane Cam 4 2017-04-13 15:03:40



Block19 LS Lane Cam 3 2017-04-13 15:03:40

Another look at the numbers, with  
automated landside operation

- Operations still run **10** hours each day.
- We still have **26** landside transfer zones.

## On Average...

- Landside move takes ~~3.53~~ **2.9** minutes
- Crane performs ~~17~~ **21+** moves  
(per hour in the landside)
- 'Hang Time' is ~~33~~ **15** seconds  
(per move).



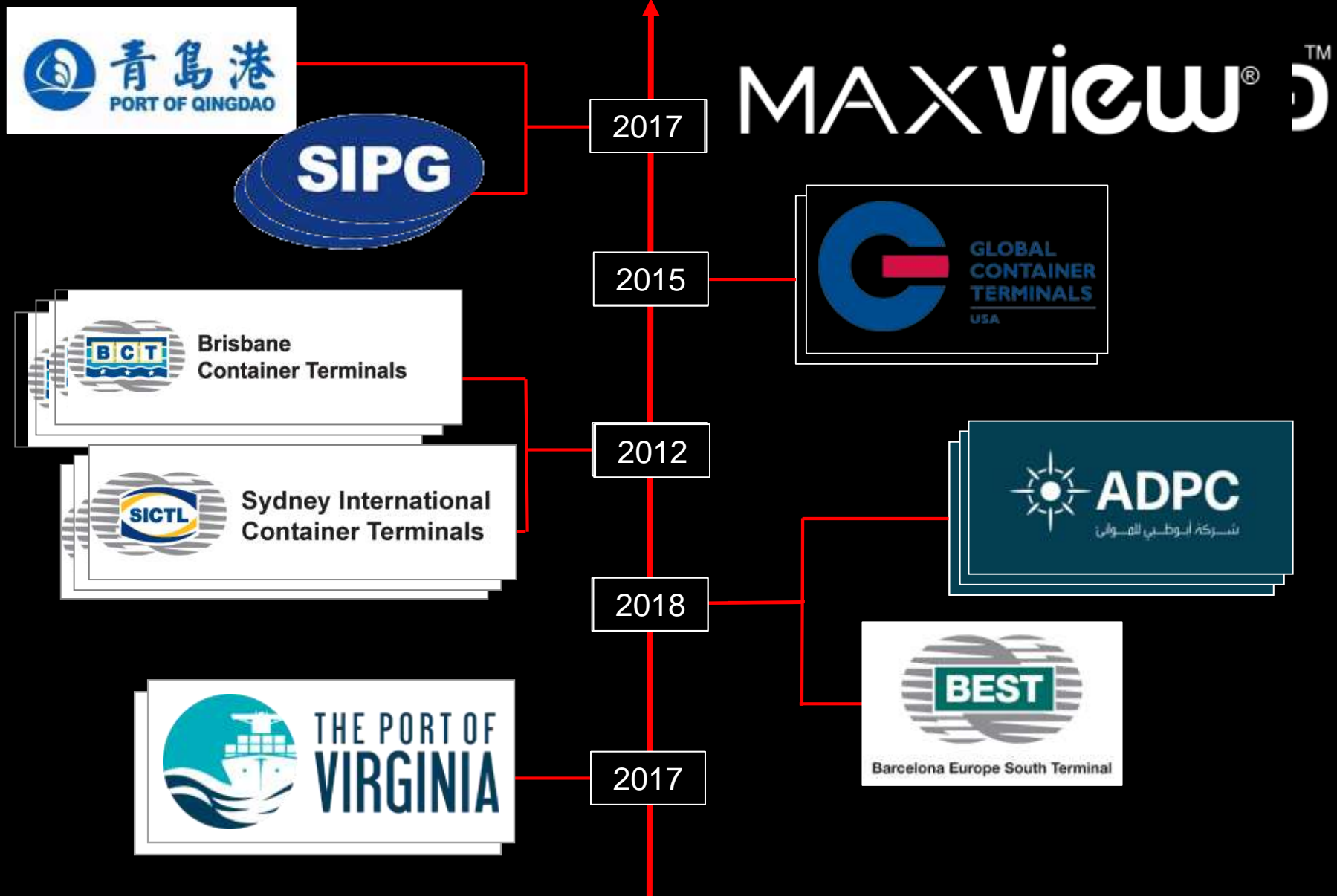
- Landside moves / hour improved from  
**17** to **21**
- **170** moves per day / stack to **210**...  
**20% increase**
- **40 extra boxes per day / stack**
- **1,040 extra boxes per day / whole yard!**

- Saved 18 seconds of hang time on each truck exchange...
- Increased throughput by 1,040 extra boxes a day
- *What's that worth to your terminal?*

## Added benefits:

- Lower truck wait times, Lower Emissions
- Higher throughput in the container stacks
- Higher utilization of your yard
- Higher efficiency for your stacking cranes

# DELIVERED ON TIME & ON BUDGET



Maxview4D™ is a new platform for crane automation  
More automation features coming soon!

Advanced 4D data processing and computer vision techniques

$$\frac{3D \text{ Data}}{Time} = 4D$$

Minimal hardware additions:

Uses only crane mounted devices (no civil work!)

Great Success so far:

Deployed at 2 sites, being commissioned at one,  
and more to come this year.

# MAXview<sup>TM</sup>

# Questions?

*Delivering Customer Success,  
Every Project,  
Every Time . . .*

**TMEiC**