WEBINAR
Container Terminal Automation - Real World Solutions

Join us on
Wednesday 28 October

10am - 11 30am CET
5pm - 6 30pm Hong Kong
8pm - 9 30pm Sydney

Sponsored by
RAM SPREADERS

CONTAINER TERMINAL AUTOMATION
REAL WORLD SOLUTIONS

WE HAVE TAKEN A SLIGHTLY DIFFERENT APPROACH TO TERMINAL AUTOMATION & REAL WORLD SOLUTIONS

OUR APPROACH IS:

- <u>EQUIPMENT</u> INDEPENDENT | <u>MODE</u> INDPENDENT | <u>TOS</u> INDEPENDENT

- ABLE TO BE RETROFITTED TO EXISTING ASSETS & TOS - AS WELL AS NEW

- ABLE TO BE PHASED TO HELP MANAGE AND APPEAL TO DIFFERENT RISK APPETITES & COST vs RETURN PROFILES

Marrying expertise for the benefit of all

This exclusive partnership, includes leading technology and pioneering industry partner companies operating with vision to provide "End to End Plus Services (E2E+)" for Ports globally. This partnership brings a wealth of proven port industry experience, track record experience and results which others can benefit from.

| JACOBS	iSpec	TRENT PORT SERVICES	igo Solutions	AID
JACOBS is one of the world's premier design, engineering, construction and technical services companies, delivering end-to-end innovative solutions that provide superior value to clients around the world.	iSpec – an industry proven and time-tested solution with a 15-year track record of excellence in the port industry, delivering over USD3 Billion of port related equipment.	TRENT is a global provider of port solutions and services, experts in Asset Management and large strategic port equipment procurement projects and deliveries.	IGO SOLUTIONS is a leading provider of Ai Technology Driven Business Solutions has been solving problems for Ports, Shipping and Logistics customers for almost two decades.	AI DRIVERS is an industry pioneer in the design and development of industrial automation and autonomous horizontal transportation tailored to specialist port terminal operations.

.......working hard to make history......
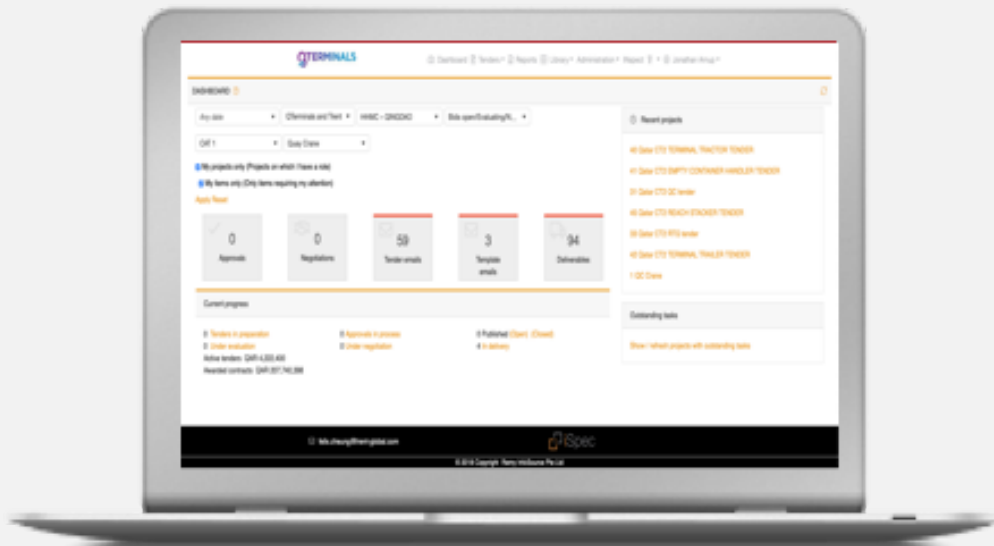
# Delivering the right Assets every time........

- ✓ **Our E2E Partners and Customer stakeholders work together as one to ensure a perfect result**

- ✓ **Create holistic, integrated, tailored specifications that manage entire deliverables**

- ✓ **Total project visibility, transparency and project management in iSpec where we have procured more than USD3 Billion of port assets worldwide.**
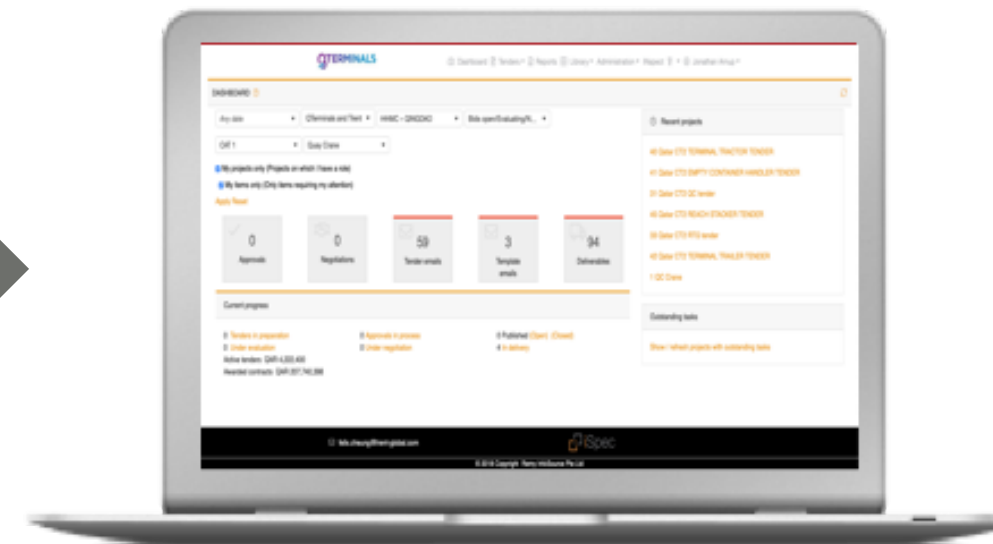
- ✓ **Use E2E Partners proven ORAT approach for turn-key design, implementation and handover to customers where required**
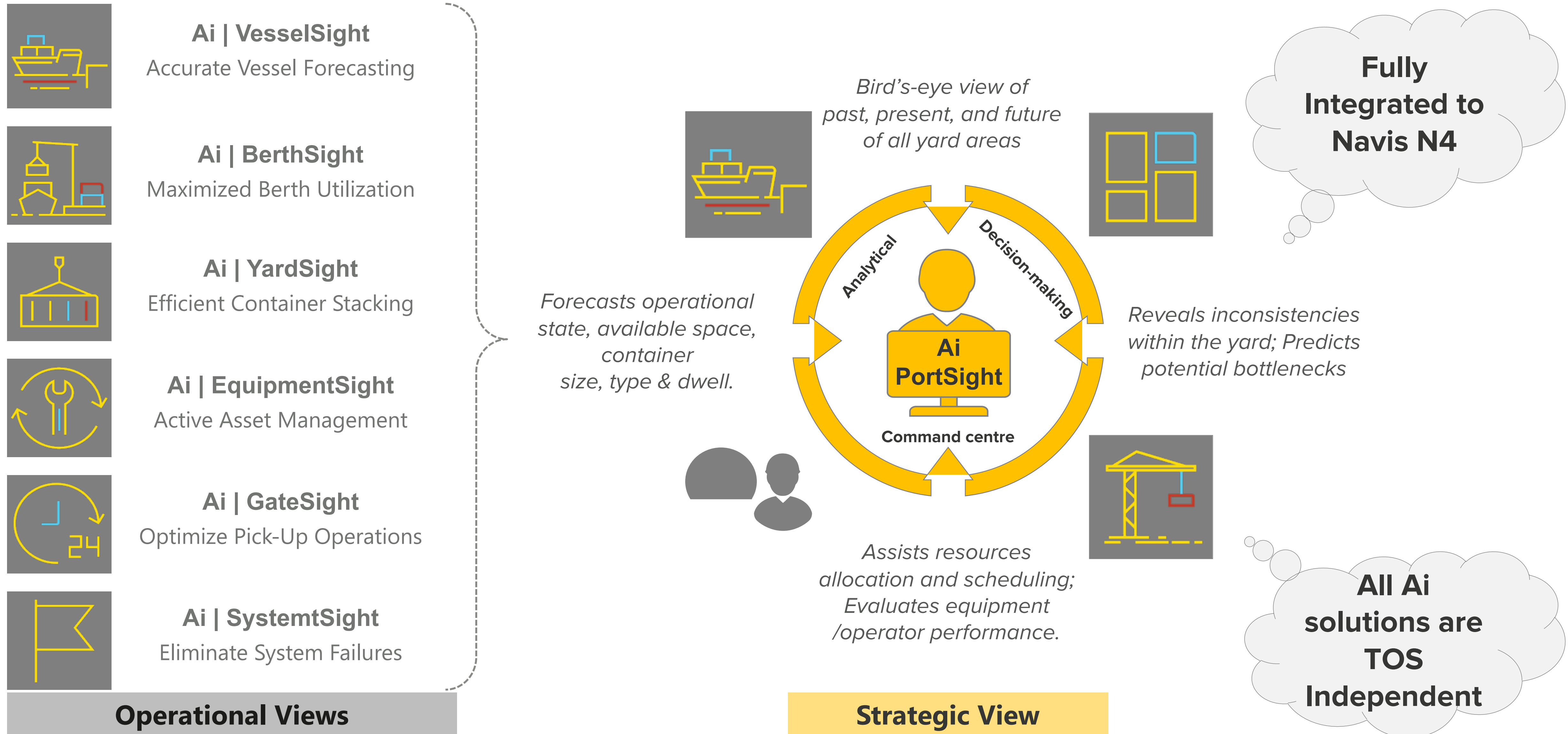
Remote Control of your Cranes and Mobile Fleet

- When you already have Remote Control operations implemented for Quay Cranes, its very easy to include the same process for your Terminal Tractors.

- Protect your business from future unforeseen pandemics and global issues that can be so disruptive.

- Supporting more inclusive work opportunities in the terminal for previously blue-collar jobs.

- Empowering females in the terminal workplace.

- Creating an environment that can change the make up of skills, people and cultures required to operate the new autonomous port of today.

Ai Driven Operations - Overview.......

Ai | VesselSight
Accurate Vessel Forecasting

Ai | BerthSight
Maximized Berth Utilization

Ai | YardSight
Efficient Container Stacking

Ai | EquipmentSight
Active Asset Management

Ai | GateSight
Optimize Pick-Up Operations

Ai | SystemtSight
Eliminate System Failures

Operational Views

Bird's-eye view of past, present, and future of all yard areas

Forecasts operational state, available space, container size, type & dwell.

Analytical

Decision-making

Ai PortSight

Command centre

Reveals inconsistencies within the yard; Predicts potential bottlenecks

Assists resources allocation and scheduling; Evaluates equipment /operator performance.

Strategic View

Fully Integrated to Navis N4

All Ai solutions are TOS Independent

TRENT
PORT
SERVICES

Ai Driven Operations – Case Study.......

CONFIGURATION - 16,000 fixed ground slot capacity | 1 + M TEU | 15 x STS | 45 x RTGs

BEFORE:

- Moves Per Hour: 24
- Yard Utilization Rate: 78%
- Average Energy Usage: 1x

Baseline Discharge Optimized Discharge

Baseline Deliver Optimized Deliver

AFTER:

- ✓ Moves Per Hour: 28
- ✓ Yard Utilization Rate: 82%
- ✓ Average Energy Usage: 0.95x

Decrease

3%

In Energy Utilisation

Increase

5%

In Throughput

Increase

4%

In Yard Utilisation

.....and this is just the beginning

Ai Asset Failure Prediction.......

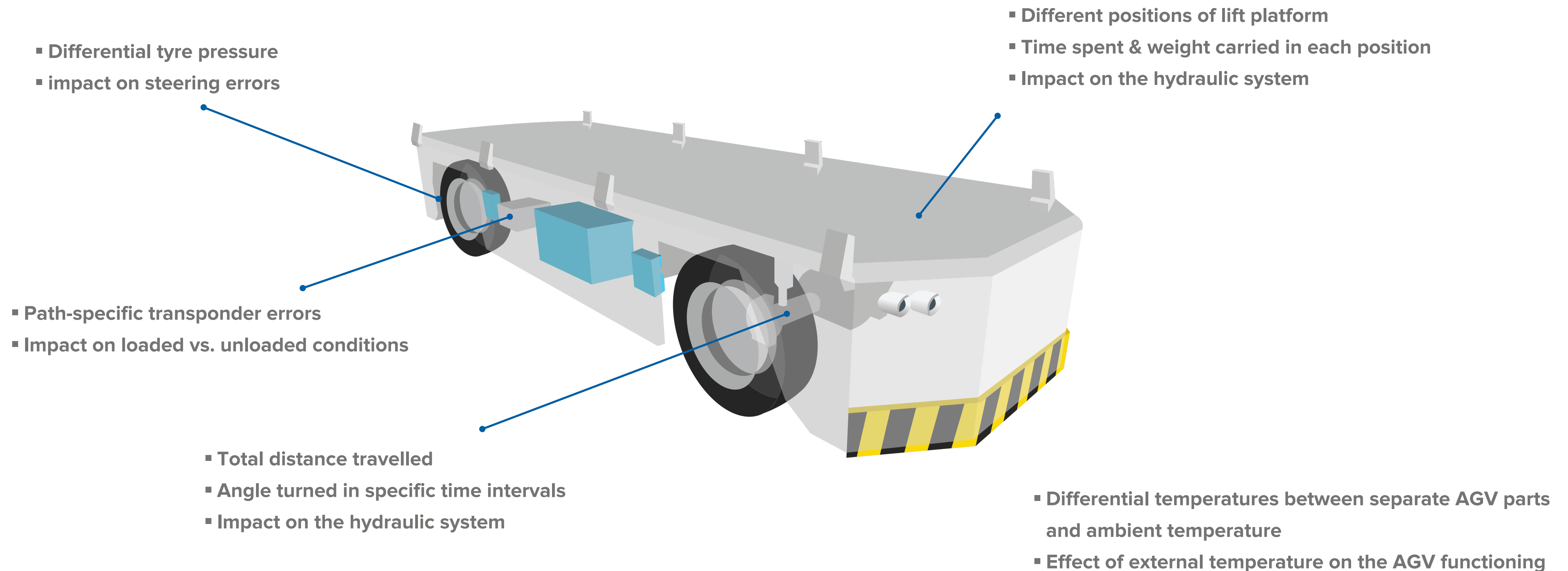|	
- Client Profile:	A fully automated terminal with 60 AGV's in operation.
- The Goals:	Predict a critical AGV failure 2-8 hours in advance & Minimize operational impact
- Engagement Scope:	Create a prototype that can predict failures with at least 62% precision & Integrate the solution with the existing standard operating procedures

▪ Differential tyre pressure
▪ impact on steering errors

▪ Different positions of lift platform
▪ Time spent & weight carried in each position
▪ Impact on the hydraulic system

▪ Path-specific transponder errors
▪ Impact on loaded vs. unloaded conditions

▪ Total distance travelled
▪ Angle turned in specific time intervals
▪ Impact on the hydraulic system

▪ Differential temperatures between separate AGV parts and ambient temperature
▪ Effect of external temperature on the AGV functioning

Ai Asset Failure Prediction – Case Study…….

BEFORE:

- Average Perimeter Stops per Day = 2.5

- Average Cost per AGV Breakdown = 1x

AFTER:

- ✓ Average Perimeter Stops per Day = < 1.5

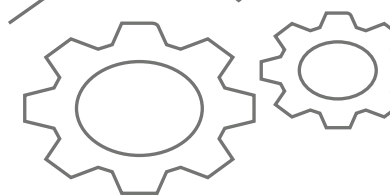- ✓ Average Cost per AGV Breakdown = 0.9x
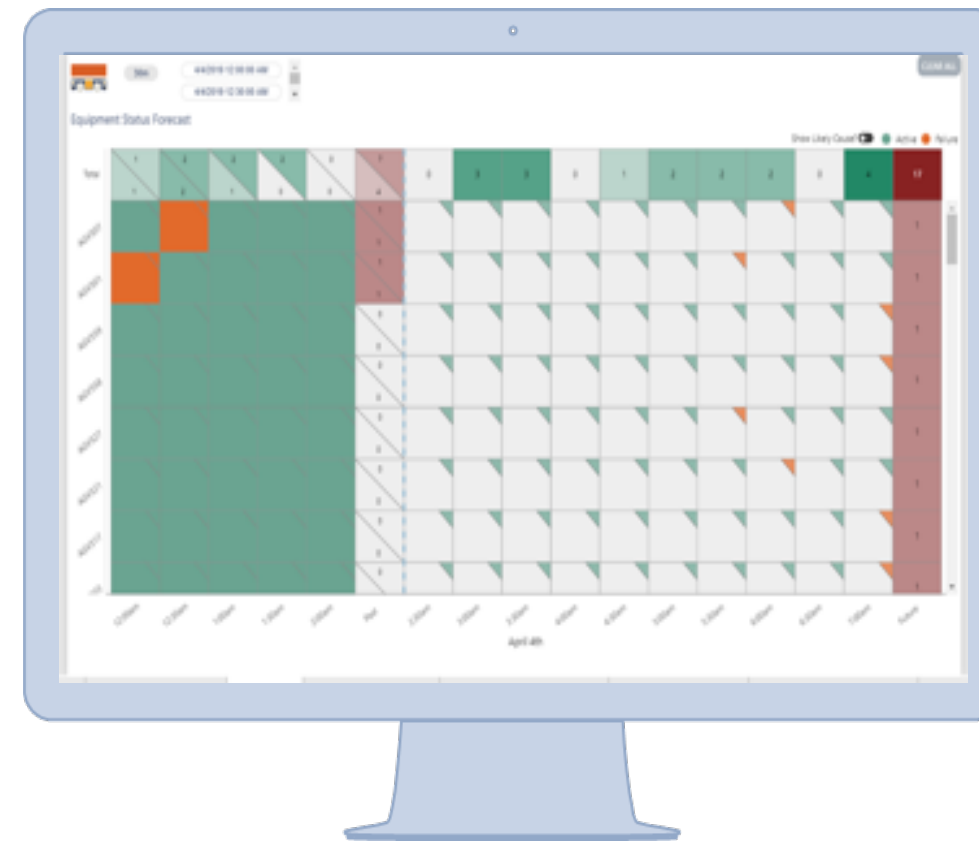
The Results

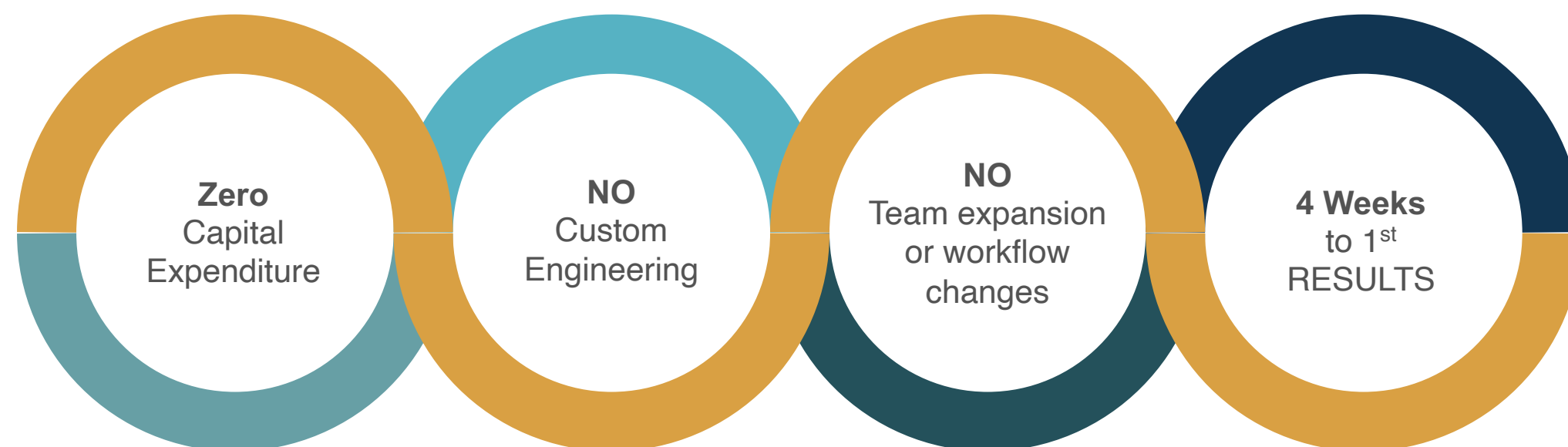**75**% **Confidence Level** in **Predicting** AGV failures 2-4 hours in advance

10 **High Risk AGVs** identified to date - anomalies validated by the Client Engineering team

New KPI's generated by EquipmentSight™ **to indicate impending failures.**

Zero Capital Expenditure

NO Custom Engineering

NO Team expansion or workflow changes

4 Weeks to 1st RESULTS

3% ↑ in operational efficiency improvement per terminal
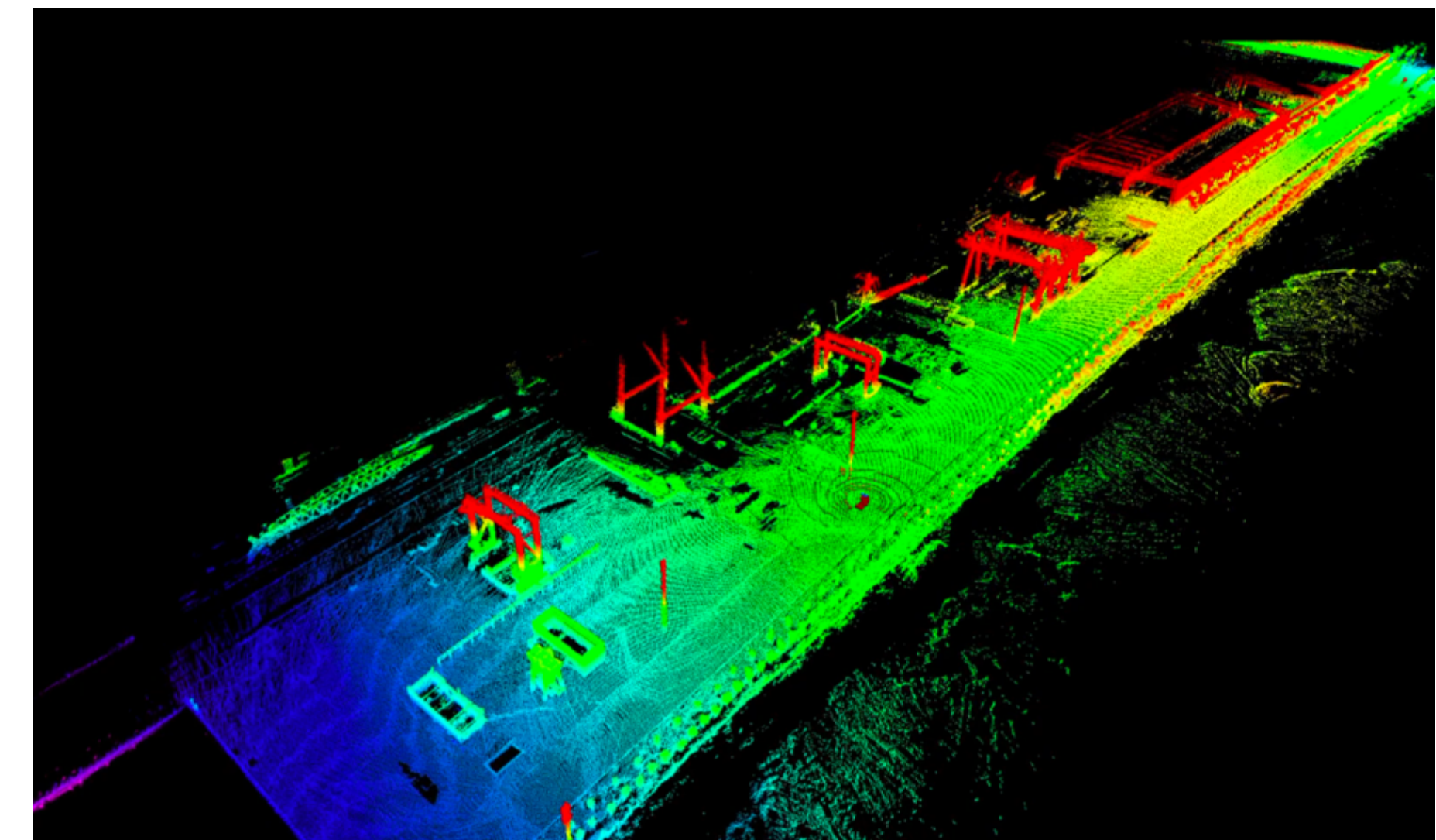
Ai Autonomous Automation........

The Problem we are Trying to Solve:

1. Improve Safety
2. Reduce Accidents
3. Reduce Opex Costs
4. Extend Asset Life / Improved ROIC
5. Reduce Business Interruption & Operational Risk

(a) Roof LiDAR Sensors Plate

(b) Front LiDAR, RADAR & Camera Sensors Plate

(a + b = c) Front LiDAR, RADAR & Camera Sensors Plate

Retrofit to your old ITV or add to New

3D Mapping and Localisation for Autonomous Terminal Operations.

Precision Positioning

- **No ground proximity sensors or GPS required**

- **Multi- sensory data fusion for precision positioning +/- 2cm**

Ai Autonomous Automation – Case Study.......

- The table below are actual data <u>as recorded by terminal operator</u> after **converting** manual ITV's to Autonomous units.

- Implementation, testing and data collection spanned a 24 month period.

- The terminal was a 24-hour operation.

Components	Manual Truck	Autonomous Truck
Fuel cost per box	$0.78	$0.54
Maintenance cost per box	$0.71	$0.49
Driver cost per box	$3.68	$0.27
OPEX Per Truck Per Year	$133,948	$33,917

***Note* -** *Saving may vary from country to country, terminal to terminal*

THANK YOU