



**DP WORLD**



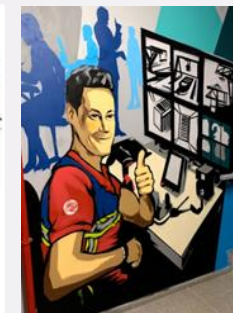
# PORT AUTOMATION

Smart Port Global Trends in the Ports and Terminals Industry

# WHY THE AUTOMATION

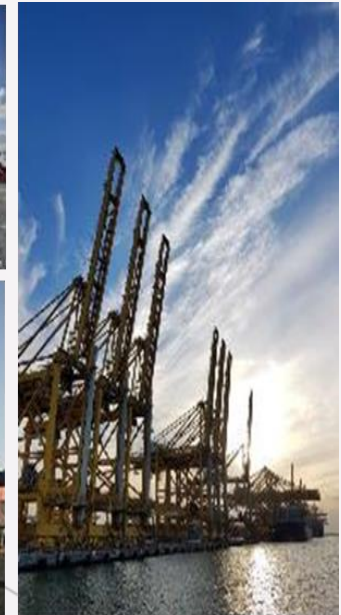
- Increased productivity, thanks to a better occupation of the Automated Equipment and the development of methodical and orderly operations.
- Reductions in operating and maintenance costs.
- Can handle cargo handling, yard management, and vessel traffic management, allowing for faster and more accurate cargo handling.
- It also allows the equipment to execute all movements without human interaction, radically reduces the labor and amount of human error due to factors such as incorrect driver location.
- Can help to reduce the risk of human error and increase safety in the workplace reducing the incidents with operators maneuvering the equipment during the container handling.
- Significant fuel and energy savings are realized through optimal driving, also a contribution to the decarbonization, reducing the CO2 emissions.
- Reduce the risk of investing in such locations where labor is difficult to find to operate the Terminal.
- Reduce short cyclic work.

BOXBAY / HIGH BAY STORAGE

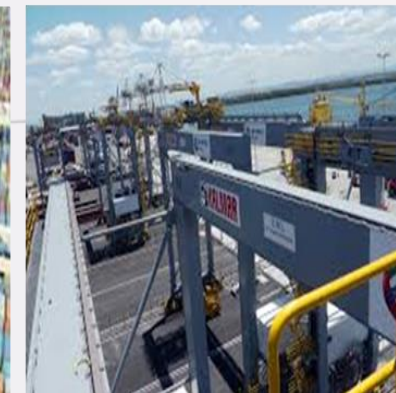


# SEVERAL TYPES OF AUTOMATION ARE USED IN PORTS AND TERMINALS TODAY

- Semi-Automated STS Cranes
- Automated Yard Cranes
- Automated Container Handling Equipment (ATT, AGV & AShC)
- Automated Storage and Retrieval Systems (AS/RS)
- Systems (ACHS)
- Automated Gates and Entry System
- Automated Surveillance System
- Automated Customs Clearance
- Terminal Operating Systems (TOS)



**Automated terminals are becoming more mature**



# SMART PORTS TRANSFORMATION

- Total investment in smart ports is expected to reach USD 5.7 billion by 2027, up from USD 1.9 billion in 2022
- A study by McKinsey & Company estimates that the use of automation and digital technology in ports could lead to a 30-50% reduction in operating costs and a 15-20% increase in productivity.
- According to a Boston Consulting Group study, using automation and technology in ports could lead to a reduction in greenhouse gas emissions of up to 30%.
- A study by the Port of Rotterdam estimates that implementing automation and technology in ports could lead to a 20-30% reduction in transportation costs for cargo.
- According to a study by ZPMC, a leading port cranes and equipment manufacturer, automation in ports and terminals could lead to a 60-70% reduction in labour costs.
- A study by the International Transport Forum estimates that using automation and technology in ports could lead to a 20-30% reduction in the time it takes for ships to be loaded and unloaded.



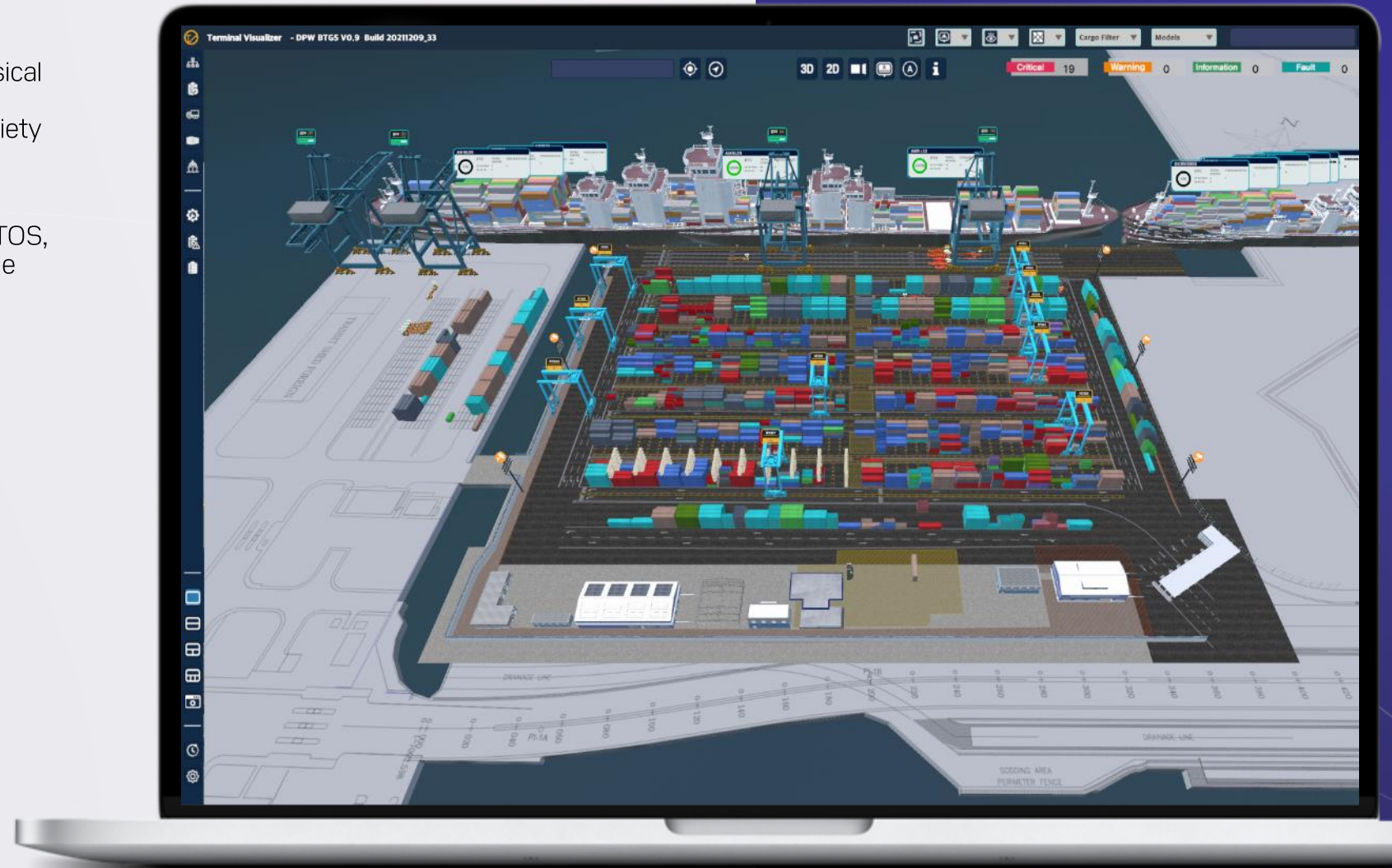
# DIGITAL TWIN

Visualize, model, simulate

Digital twins are a virtual representation of a physical system, environment, and processes, capable of representing real-time data and pulling from a variety of data sources.

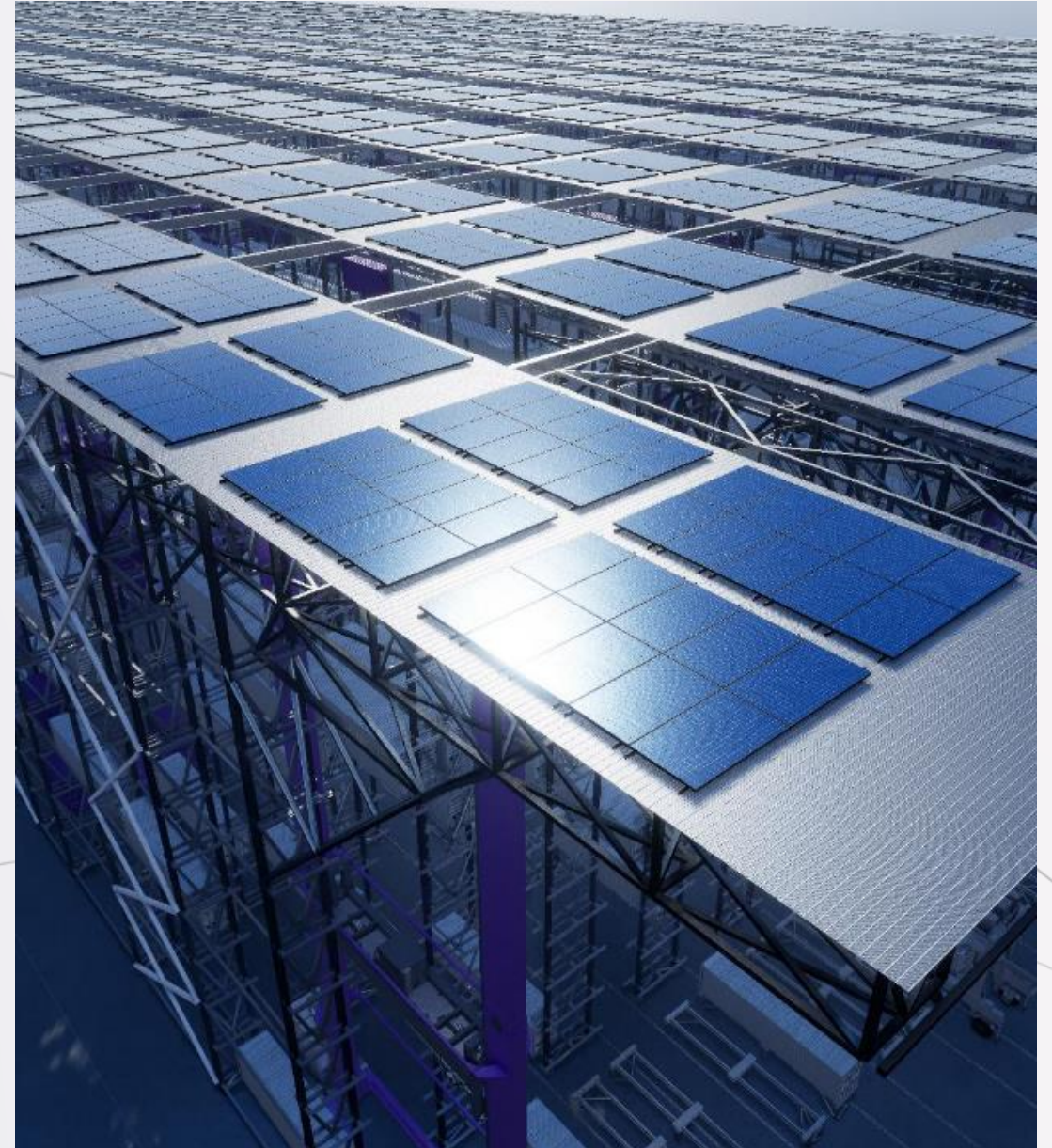
Modern trends have seen digital twin review and simulation capabilities support algorithms in the TOS, assisting in data-driven decision making to provide productivity and other gains.

- Visualization and monitoring: see real-time operations in an accurate digital twin for maximum transparency of the operations environment
- Replay and review: historical processes, past issues and problems can be used as learning opportunities or as basis for process improvement initiatives
- Simulation: the digital twin can be used to run simulated projections of how new processes, equipment and asset planning will affect work. Useful for planning, testing, training and forecasting tasks



# ANNEX : MINIMUM ENVIRONMENTAL IMPACT

- 30% of space compared conventional yard
- Less reclamation and use of sand
- Only yard with roof top solar plant possibility
- High energy efficiency, NO containers lifted over container stacks
- All equipment is electrical driven, advanced power regeneration features horizontal and vertically
- Reefers stored under roof, in hot climate lower energy consumption
- Noise and light suppressed operation
- Better public acceptance in urban residential environment
- Zero local emissions, positive energy balance
- Lowest power consumption in class



# ANNEX: RESULTS PROOF OF CONCEPT ABOVE EXPECTATION, WE MEASURED:

Stacker Crane  
WS table v.v.  
19+ mph

Stacker Crane  
5000 MMBF

Stacker crane  
in rack  
performance  
22 mph

Truck Transfer  
Crane 31+  
mph

Pallet  
conveyor  
44+ mph

Stacker Crane  
Energy 2.1  
Kwh per box







DP WORLD

**THANK YOU**