

# OPTIMIZING STS BACKREACH OPERATIONS

With Worker Protection

## MI-JACK EUROPE – WHAT WE DO



#### REAL-TIME LOCATING SYSTEM (RTLS/PDS)

Redundant tracking system

Movements monitoring

 Localize and identify all personnel, machines, cranes and vehicles in the yard





## MI-JACK EUROPE – WHAT WE DO

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#### **MINIMIZING RISK**

- Anti-Collision Machine/Machine and Machine/Personnel
- CAS
  - no suspended loads
  - Different areas
  - Different functions

#### **MAXIMIZING EFFICIENCY**

- Simultaneous workflow between cranes and personnel
- Path optimization for cranes based on real-time yard traffic analysis
- Automation Level according to individual requirements



## WITH WHOM DID WE WORK?

### • NORTH AMERICA

- CSX Intermodal, Winter Haven, USA
- CSX Intermodal, Fairburn, USA
- CSX Intermodal, Rocky Mount, USA
- UP Railroad, Joliet, USA
- DP World, Vancouver, CAN
- LBCT, Long Beach, USA
- EUROPE
  - Eurogate, Hamburg, GER
  - Interporto, Padua, ITA







# THE PROJECT

STS Backreach Operations Optimization – Proof of Concept at Eurogate Terminal, Hamburg



17.03.2025

## THE CHALLENGE



## THE CHALLENGE

What needs to be done to guarantee safe, simultaneous collaboration between humans and machines in the STS backreach?





### WHAT DID WE WANT TO ACHIEVE?



1. Increasing Safety in the backreach of the STS crane



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2. Determination of Positions of equipped persons and provide the option of activating warnings



3. Minimisation of work interruptions

4. Scalability

Extendable to other areas of the terminal in the future.



# WHAT WAS THE CONCEPT?

- System recognizes position of object in the "safe" zone
- System gives feedback through filled, green zone
- Signal to Straddle carriers that they can pass





# WHAT WAS THE CONCEPT?

- System recognises position of object in the "unsafe zone"
- System gives feedback by filling in the red zone
- Straddle carriers must stop





## WHICH TECHNOLOGY DID WE USE?

Multilateration

ToF & TDoA

Sub 1 GHz

UWB (6,5 GHz)







1.0 Loop Begin: 🔰 23:46:47.625 📜 Loop End: 🔰 23:46:47.625



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## WHAT WAS THE ANTENNA LAYOUT?



## WHAT HAVE WE ACHIEVED?



Awareness of good processes and processes with room for enhancement by discussion and scope definition



**Increasing the visibility of personnel** in a very dangerous work environment - RTLS



#### Allow safe and simultaneous operation

It is possible that straddle carrier drivers know that there is a person in the dangerous area without seeing it





- Use of technology was proofed and can be extended
- Technology is scalable
- Acceptance of customer



# WHAT TO CONSIDER WHEN AUTOMATING A TERMINAL?

How can automation take place? / What are your rules for automation?

How can technology in your terminal facilitate safer operations?

How do you measure the value of safety? What are the KPIs?



### WHAT TO CONSIDER?

## How can automation take place? / What are your rules for automation?

- ✓Think before act / write down, what you want to achieve
- ✓More detailed definition in the beginning Less surprises and expensive changes
- ✓ Define your processes / Activity-Frequency-Matrix

## How can technology in your terminal facilitate safer operations?

- ✓Every technology has advantages and disadvantages
- ✓Match the technology with your goals
- ✓Avoid exceptions

## How do you measure the value of safety? What are the KPIs?

- ✓Safety
- ✓Operational Availability

