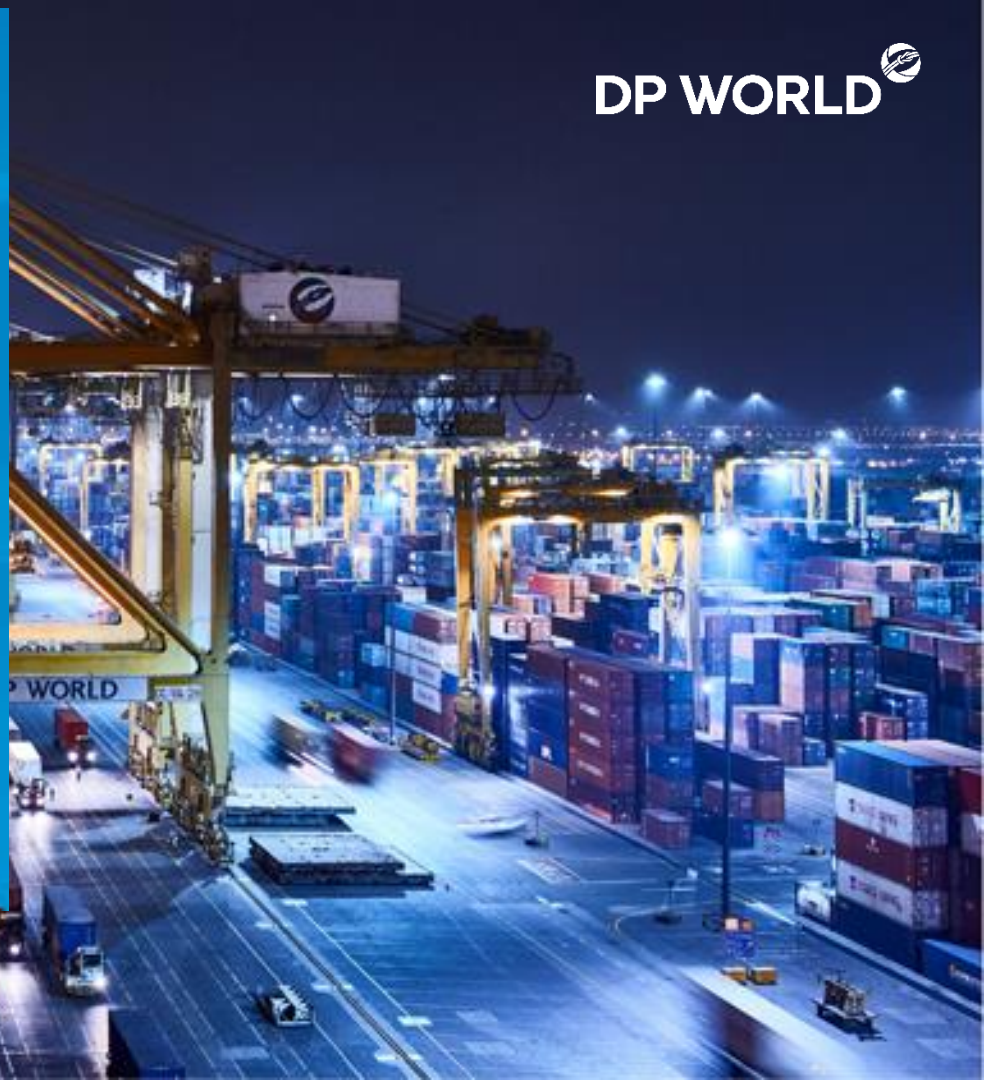


# Terminal Automation

## A reality Check... The Sequel

Jan Cuppens  
Director Global Engineering  
TOC R'dam 2018

Creating the Future, **Now.**





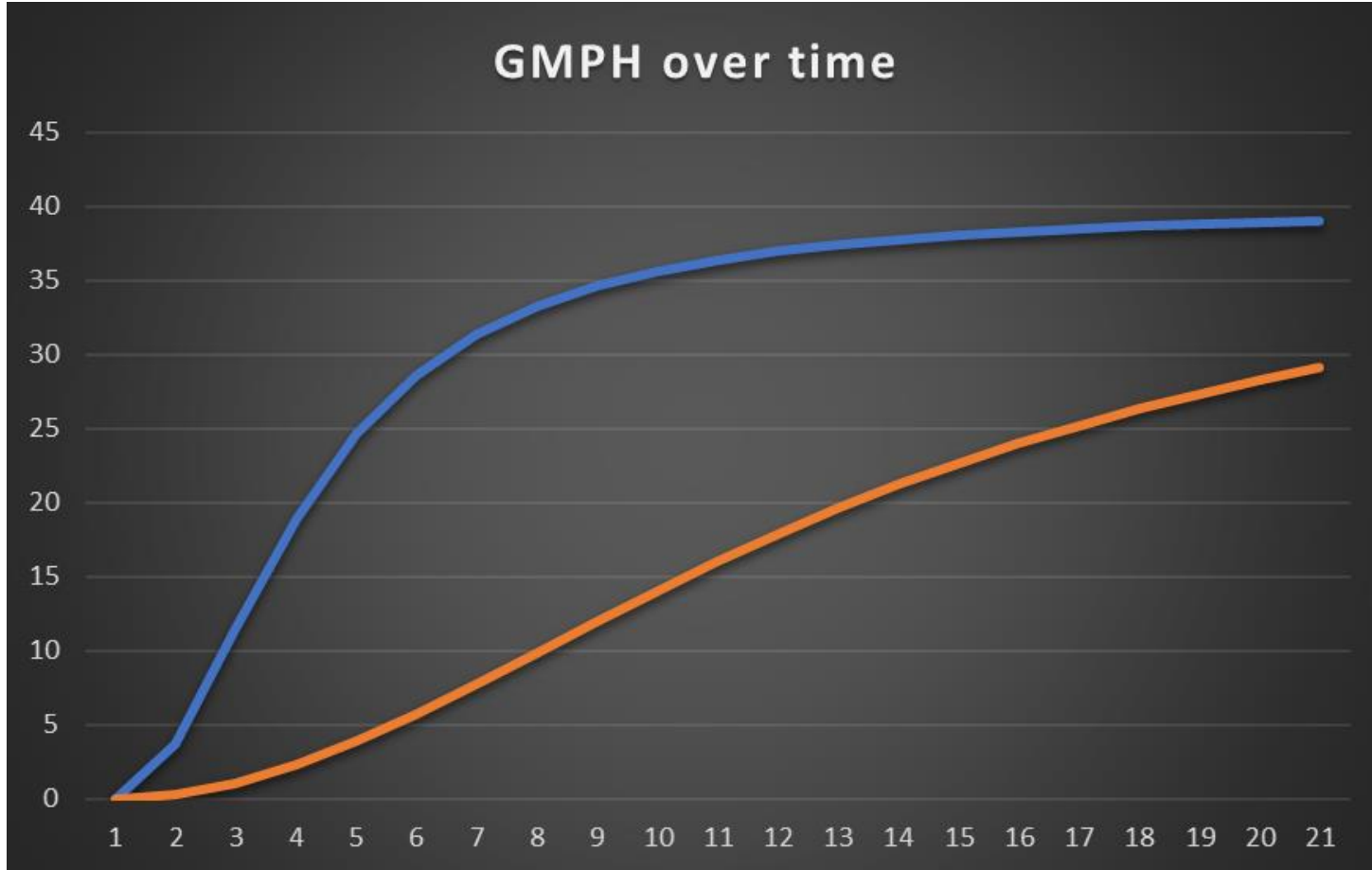
Let's have a look at what we have today...



# 1 Simplification

# 2 Reliability

# 3 Decision taking



# 1

## Simplification

- ? Undo the over optimization
- ? Apply simple principles such as
  - Container is always put on a rack
  - No routing optimizing once route defined
  - Main trolley has always the priority
- ? UX/UI operator
  - No interpretation by operator – guidance by the UI
- ? Ship profile – fundamentally: do we use the correct technology
- ...



# 2

## Reliability

**Vision:**      No breakdown between Services  
                     No breakdown when handling a vessel

# 2 Reliability



Crane time 150Hrs

$$R = e^{\left(-\frac{T}{MTBF}\right)}$$



4 million parts

# 2 Reliability



Crane time 150Hrs

1 laser end to end



MTBF = 50.000 + 10 connections  
T=150Hr

50000 R = 97%

5000 R = 74%

2 lasers in parallel



50000 R = 99% (2% up)

5000 R = 93% (25% up)



# 3

## Decision taking

? Fleet management

→ TOS-ECS-Equipment responsibility discussion

? Fundamentally

→ Why does it change when I take the man out of the machine?

→ Apply machine learning to understand what a driver does and bring decision taking on machine level...maybe we can re-use the "good-old" TOS?

# 1-2-3

## What does this mean?

? Customer

→ Probably accept higher Capex

? Supplier

→ Offer Reliability Centered System

@ MTBF of 150hrs = standard price

@ MTBF of 500hrs = optional

# 4 Automation Market Potential

# 5 Hurdles

# 4









## Automation Market Potential

- ! Brownfield
- ! A-RTG
- ! A-TT

# 5 Hurdles

- ! A-RTG and A-TT will be OK as a vehicle – timeline unclear however
- ! Mixed manned/autonomous traffic needs to be possible
- ! Fleet management/equipment scheduler = issue
- ! Incremental Business Case







GROUP A		GROUP B	
 RUSSIA	 PORTUGAL		
 SAUDI ARABIA	 SPAIN		
 EGYPT	 MOROCCO		
 URUGUAY	 IR IRAN		

GROUP C		GROUP D	
 FRANCE	 ARGENTINA		
 AUSTRALIA	 ICELAND		
 PERU	 CROATIA		
 DENMARK	 NIGERIA		



FIFA WORLD CUP  
RUSSIA 2018

GROUP E		GROUP F	
 BRAZIL	 GERMANY		
 SWITZERLAND	 MEXICO		
 COSTA RICA	 SWEDEN		
 SERBIA	 KOREA REPUBLIC		

GROUP G		GROUP H	
 BELGIUM	 POLAND		
 PANAMA	 SENEGAL		
 TUNISIA	 COLOMBIA		
 ENGLAND	 JAPAN		

