

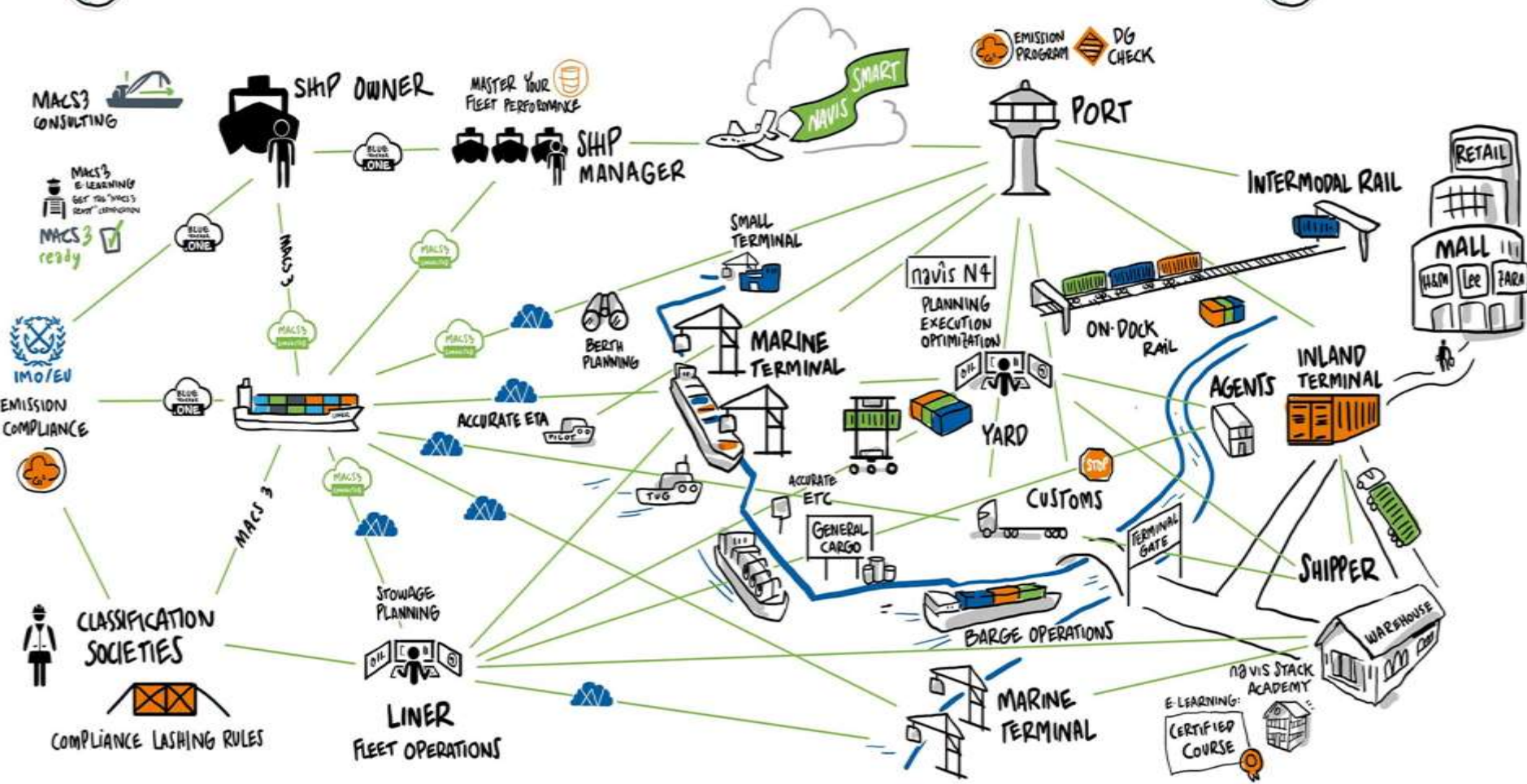


Next Generation Ports & Terminals: Digitization and Smart Apps



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CONNECTED ECOSYSTEM



The world's no. 1 TOS provider



30+ YEARS
460+ TOS TERMINALS
86 COUNTRIES
335+ NAVIS
TERMINAL LIVE
300 COMMITTED
13 OFFICES



Focus Areas

1

Data is King

Navis and Xvela assets are in the right place to “facilitate” blockchain and other xncs

2

Collaboration is Critical

We must be specific as to what this means – less focus on ownership – more on value.

3

Complexity is Lost Value

Deployments are hard, pricing models, value suffers through incremental innovation.

4

Security, Privacy and Control

Cloud transitions are real – cloud is a means – not the end

5

Adjacencies & Value Mapping

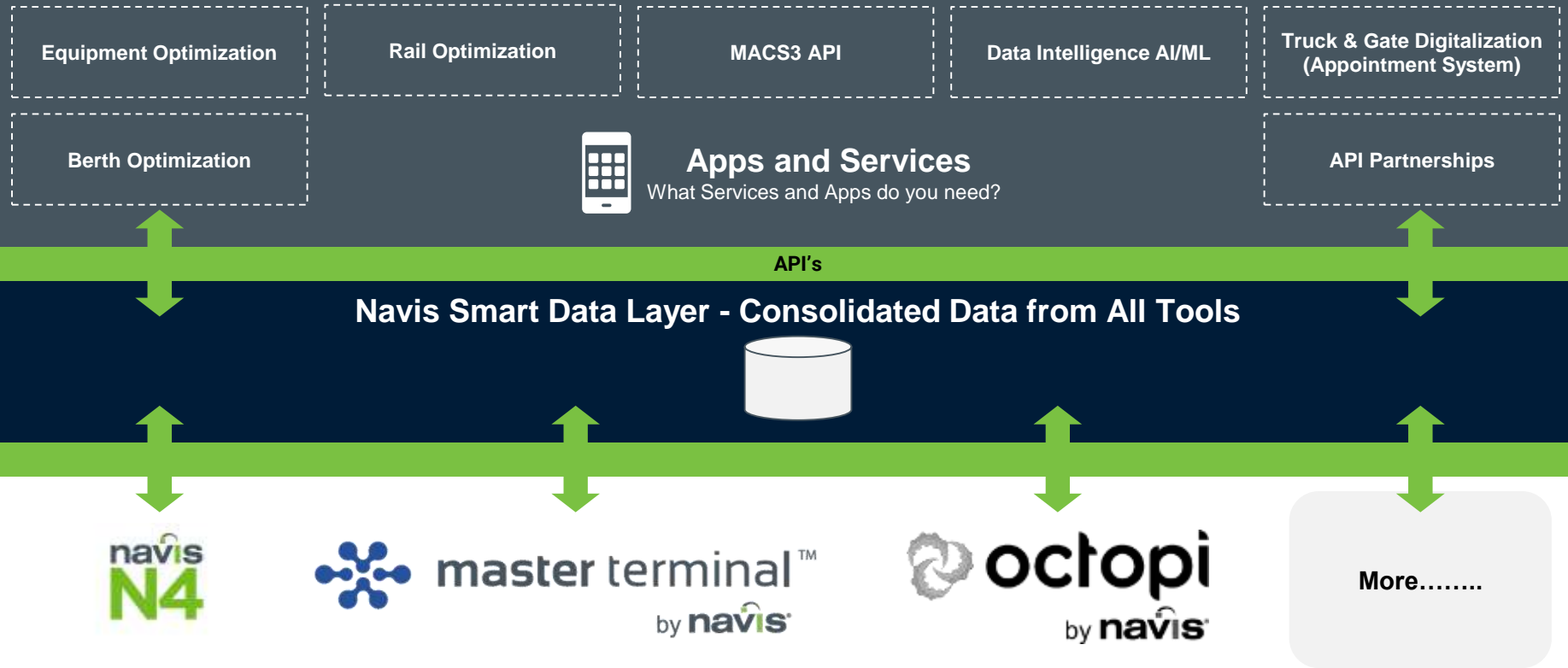
How far does the value chain go for smart container? Tracking, tracing, origination...

6

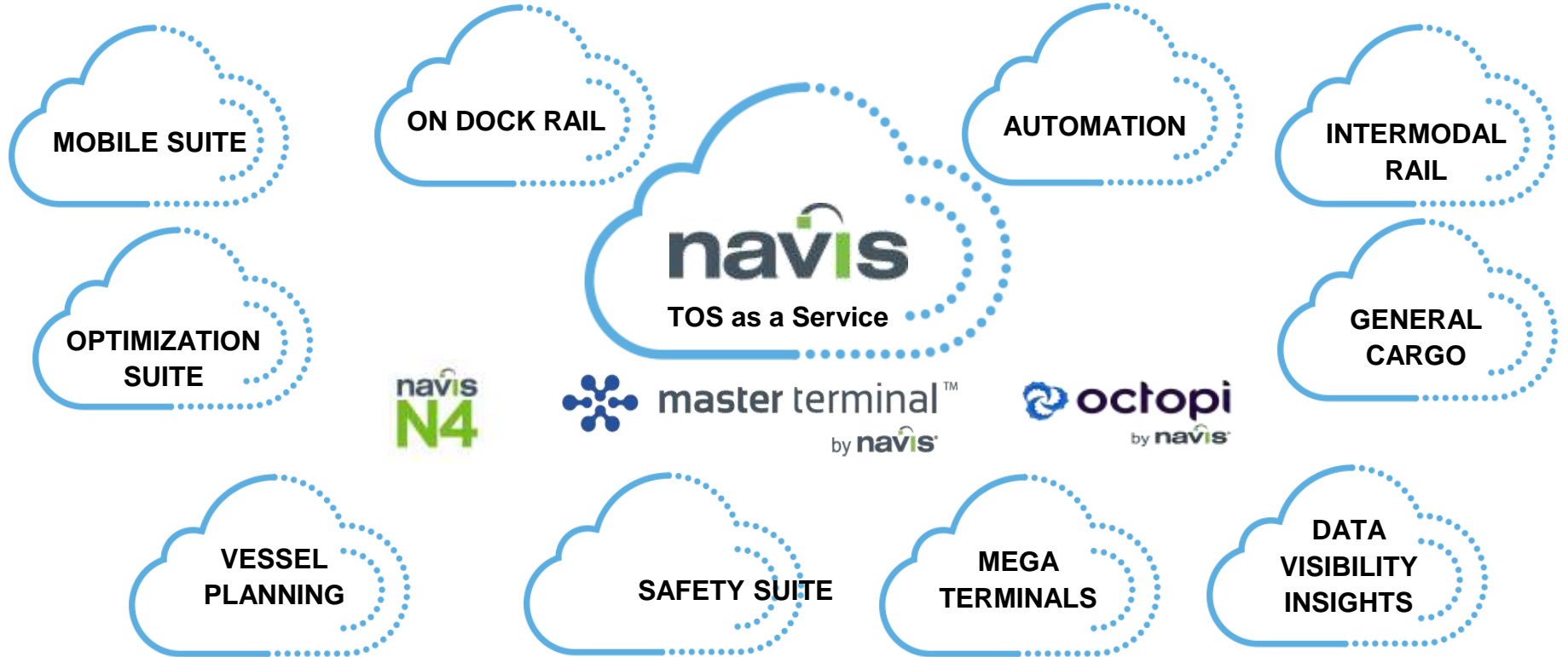
Navis Smart

Visibility, Analytics, Automation that learns will drive efficiencies & customers are willing to pay for add-ons that enable that

Navis Smart - Way to Connect & Integrate



Pulling our roadmap together



Innovations for next Gen Ports and Intermodal Terminals



TOS AS A SERVICE

MOBILE SUITE

VESSEL PLANNING

SAFETY SUITE

OPTIMIZATION

Early Adopters
Scaling
Business Transformation


Reefer
Gate Appointments
Pinning
Lashing
Hatch Clerk
Notifications
Rail

Ops View
Tower Checker

Compass
Berthing
Stability
Ship Library

Ops View
Tower Checker

Yard Crane Optimization
HT Scheduler
New UX

 master terminal™
by navis®



 octopi
by navis®

TOS as a Service

New N4 deployment option where Navis:

- Hosts a “project ready” N4 TOS for the customer
- Provides technical services to ensure customers have the best possible network connections from their terminal to their hosted N4 TOS
- Provides DBA and system monitoring services to maintain the health of N4



Benefits of N4 as a Service:

Simplicity: Removes the IT burden of setting up and managing their N4 TOS

TCO: Significantly reduces startup and ongoing costs

Speed: Get your N4 TOS in hours, not months

Ease of Adoption: Significantly speeds up the implementation time

Support: Simplifies and enables proactive support, reducing costs while providing better service



How does it work

Navis manages the hosted N4 TOS:

- Provisioning the infrastructure
- N4 installation
- Terminal connectivity*
- Database administration
- System monitoring

How do customers access N4 as a Service:

- **Current customers** use their existing N4 license and add the service subscription
- **New customers** acquire a new TOS license or subscription and add the service subscription
- **N4 as a Service customers** use the current Navis Support channels for N4 application support. Support will work with Cloud Ops as needed.



“I’m in the business of running a Terminal, not managing IT”

- **Deployment in cloud is attractive from a cost perspective**
- **Why do customers like cloud**
 - Small terminals don’t have resources for on-site IT support
 - Lower upfront spend
 - Economies of scale yield cost advantages in cloud
 - Possibility for easier upgrade procedures
 - Scale and flexibility in deployment



Vessel Planning Mobile Suite Safety Suite

Navis





Navis Compass

Terminal Process overview and active management



Berth Window Management

Terminal Berth Planner with web-access self service



MACS3 API Services

Stress & Stability, Dangerous Goods and Lashing APIs



Navis Ship Viewer *with MACS3 API*

Load plan compliance check for earlier acceptance



Navis Ship Library

Globally Shared Repository of accurate ship data

Compass Description & Features

Description

Navis Compass is a visual workflow management application that allows digitizing processes & checklists of vessels and train visits. It supports standardizing processes, communication and documentation before, during and after the visits.

With Navis Compass you have a single source of truth in regards to the planning & execution progress. It serves as the terminals cockpit, combining relevant information from and for different actors in a user friendly manner.

Key features:

- Workflow Management
- Proactive Alerting
- Realtime, Shared Visibility
- Audit Trail
- KPIs for SLA tracking



Description

The Berth Window Management enables terminal operators to digitize their berth plan.

With this service a terminal can easily plan berths against proforma, compare and manage vessel port stays against vessel timestamps.

The service will allow terminals to share this plan with key customers, partners and authorities to enable self-service.

Key features:

- Web-based
- Self Service Access
- Crane Management
- Proforma Management
- Multi-terminal
- Integration to TOS (N4 or other)

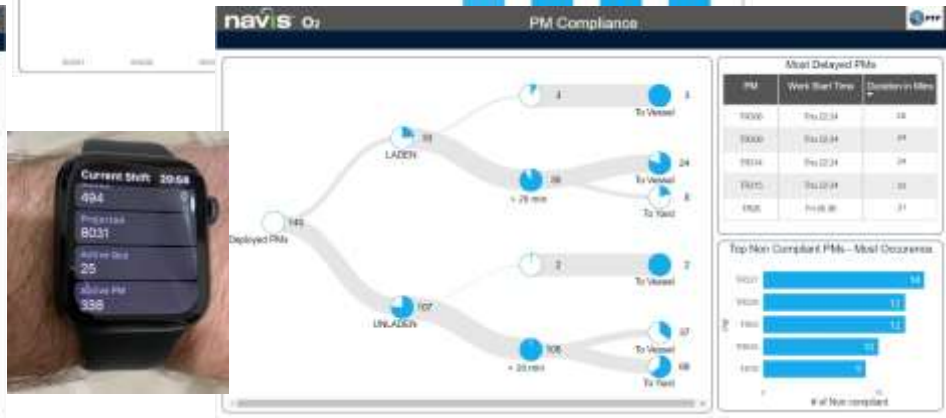


Vessel Planning in your pocket - Coming up...

Mobile App



Navis O₂ - Real-Time Operations Insights on Mobile Devices and Big Screens



Operator

CTB

Complex

Select Complex

Facility

Select Facility

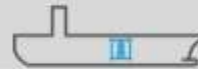
Yard

Select Yard

Cancel

Save

Twistlocks - Vessel: ATOV



Container
RETC122334 4
Destination Pin type
B332278 --

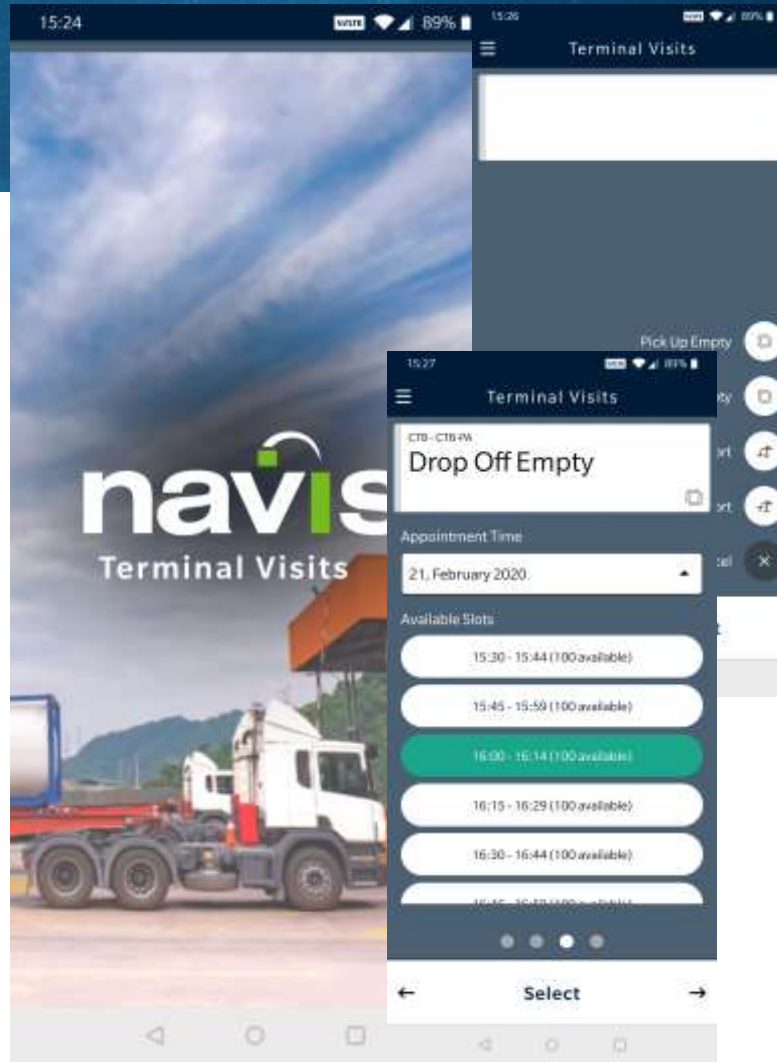
LANE01



Enter container number

SAFE

Mark SAFE when Pinning Completed and Everyone Inside Station.





5:39

Reefer Monitor

A C D

Container
CGMU9401497

Position: Y-CTB-R591051 Actions: C Req. Temp: -35°C

Container
APRU5078564

Position: Y-CTB-R592013 Actions: C Req. Temp: -25°C

Container
SEGU9515855

Position: Y-CTB-R593051 Actions: C Req. Temp: 5°C

Container
OOLU6446825

Position: Y-CTB-R596013 Actions: C Req. Temp: -21°C

Container

← ⬇ Select Reefer

17:42

Reefer Monitor

Container
BMOU950761

Position: Y-CTB-R583051 Actions: A,M Req. Temp: 18°C

Alarm Power Drain Bulb

Last Temp (C): --- Last Timestamp: 21-Feb-2020 10:22

Return Temp (C): 18 Supply Temp (C): Vent Setting: ▾

Humidity (%): O2 (%): CO2 (%):

Reefer Fault Code

1 2 3 -

4 5 6 ▾

7 8 9 ⊗

, 0 . →

17:27

Reefer Monitor

Container
TRIU803249

Position: Y-CTB-R582051 Actions: A,D Req. Temp: 21°C

Alarm Power Drain Bulb

Last Temp (C): --- Last Timestamp: 21-Feb-2020 10:22

Return Temp (C): 21 Supply Temp (C): Vent Setting: ▾

Humidity (%): O2 (%): CO2 (%):

Reefer Fault Code

Notes

Check Keypad

Cancel Update

← Reefer

Optimization Suite



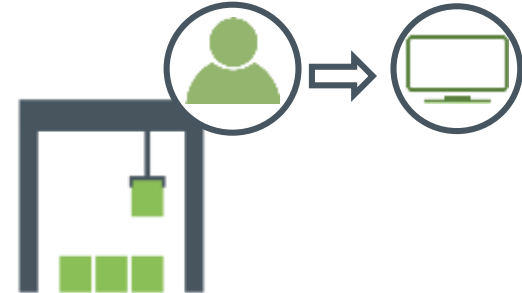
**Manned RTG
optimization**

*“I have a **existing manned RTG terminal** and want to **reduce my cost per TEU** over my fleet”*



**Greenfield
AutoRTG**

*“I’m building a **new terminal** and want to use **robotised RTGs**”*



**Brownfield
AutoRTG retrofit**

*“I have a **existing terminal with manned RTGs** and want to **transition robotised RTGs**”*



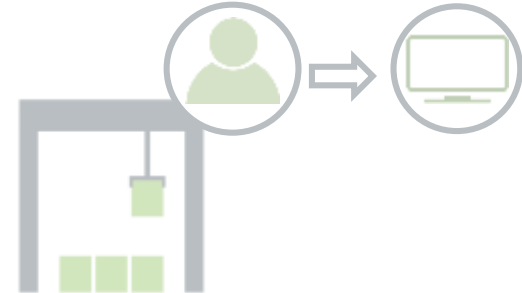
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Manned RTG Optimization - What?



Increase RTG productivity by leveraging TOS data to make decisions humans are not able to foresee.



Automate decision making on RTG job, block and lane assignment to allow dispatchers to **proactively address upcoming bottlenecks**

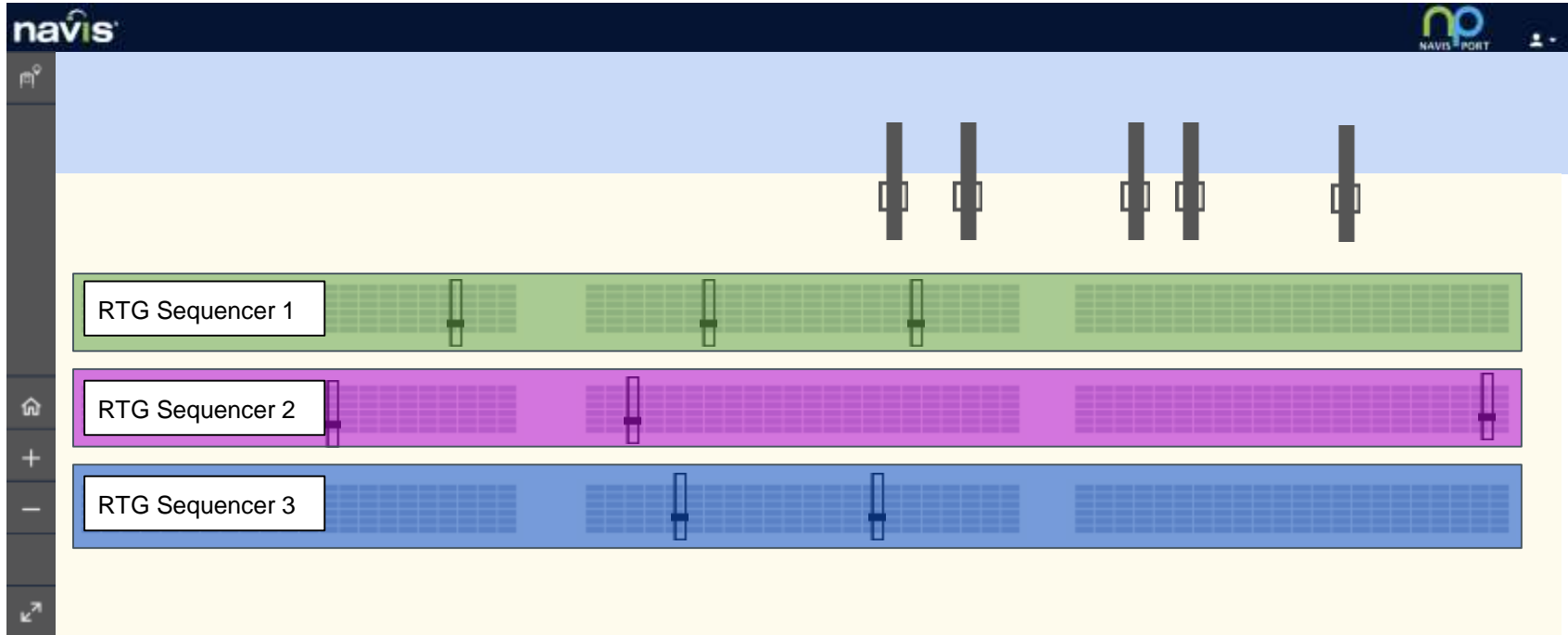


Increase visibility and control for control room dispatchers to allow more informed yard management



Manned RTG Optimization - How?

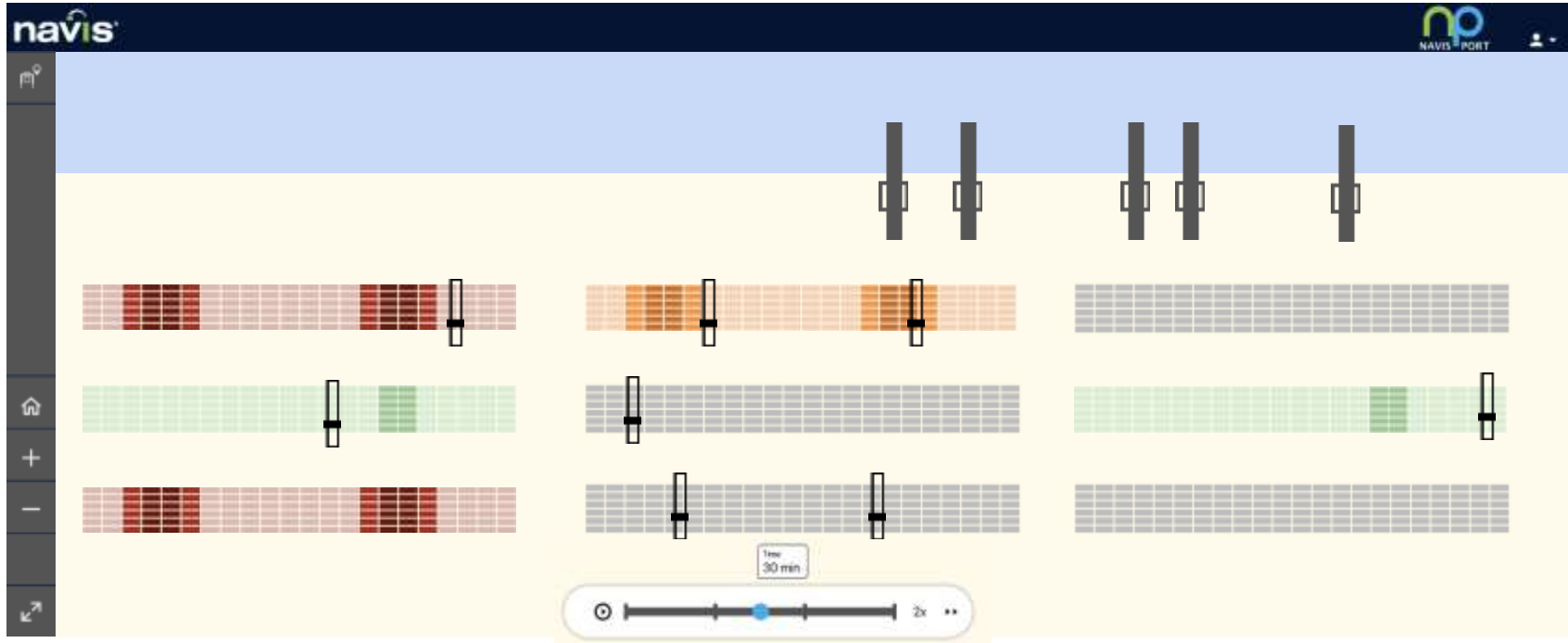
1. Automate RTG job and block assignment within a lane with RTG sequencer





Manned RTG Optimization - How?

2. Visualize upcoming yard busyness and block utilization





Manned RTG Optimization - How?

3. Suggest RTG lane changes with Yard Crane Balancer

Estimated results Shift 2

Statistics & estimated productivity

3272	Speed
1792	Discharge
8056	Tasks to
4568	Tasks OK

Average Estimated MPH vs Goal

14 / 21

87.3 Est. avg. Utilization

Estimated RTG busy by minute

Time	01	02	03	04	05	06	07	08	09	10
Busy	1.8	2.8	3.8	4.8	5.8	6.8	7.8	8.8	9.8	10.8

Recommended RTG movement:

Move RTG-03 to Calle 23 in next 40 minutes

High confidence

Decline Accept

Time: 30 min



Manned RTG Optimization - How?

4. Increased RTG driver visualization

POW: QC7 - User: Steve.A.Dore - Equip: RTG002

Trabajando

01	Contenedor TVOU558773 9 Origen: OTR6765567 Destino: BLK02.09.04.c ISO: 4400
02	Contenedor HBBU488013 0 Origen: BLK02.09.02.a Destino: QC7 ISO: 4400
03	Contenedor TVOU445004 5 Origen: BLK02.11.04.C Destino: QC7 ISO: 45Gt
04	Contenedor CECU621750 1 Origen: OTR6765567 Destino: BLK02.11.03.b ISO: 45Gt
05	Contenedor SHTU767733 0

Seleccionar trabajo a realizar

User: Steve.A.Dore - Equip: Mos02

Target container
Container: **FURU 488647 9**
Origen: BLK02.19.04.b Destino: ISO 45665 ISO: 2200

Complete to...
Rehandle

Working

TXWU679231 8

TXWU 679231 8	FURU 488647 9					
DARU 154294 6	WAGU 006700 9					
DARU 154294 6	TXBU 709559 7					
TXBU 613826 1	DARU 154294 6	GRU 890767 4				
SCU 742527 2	AGU 763104 8	HCU 903984 1				

← Lift TXWU679231 8 from BLK02.10.D.6 and place at BLK02.10.C.5



Manned RTG Optimization - How?

5. Increased RTG dispatcher visualization





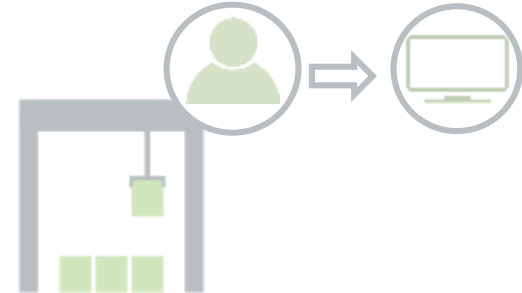
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Greenfield AutoRTG - Why?



Desire to **robotize RTGs or RMGs** for efficiency, cost, visionary or safety reasons



Increased predictability of yard operations



Higher **efficiency and flexibility** of the yardcranes



Greenfield AutoRTG - What?



Automatic sequencing and dispatching with N4 RTG sequencer and dispatcher



Automatic **Exception Handling** of AutoRTG, TT and OTR workflows



Low IT deployment costs with flexible and easily configurable optimization



Integration with ECS* and both **passive as active** PDS solutions

*JMS and Automated Yard Crane Database interface (SQL & Oracle)



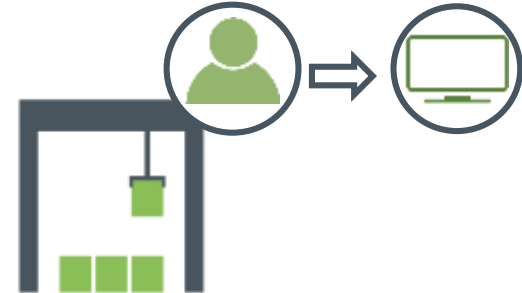
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Brownfield AutoRTG retrofit - Why?



Desire to **robotize RTGs or RMGs** for financial, visionary or safety reasons



Incrementally implement automated RTGs during **live manned operations**



Combine **benefits of RTG Optimization AND AutoRTG**

“The current key focus for terminal automation is retrofitting existing terminals, as part of wider optimization efforts driven by pressures on terminal operator financial returns. “ (Ports & Terminal Insight, Q1 2018)

Innovations for next Gen Ports and Intermodal Terminals



TOS AS A SERVICE



MOBILE SUITE



VESSEL PLANNING



SAFETY SUITE



OPTIMIZATION





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