From Port Development to Digital Transformation

Journey & Lessons Learned

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moffatt & nichol

Moffatt & Nichol Today
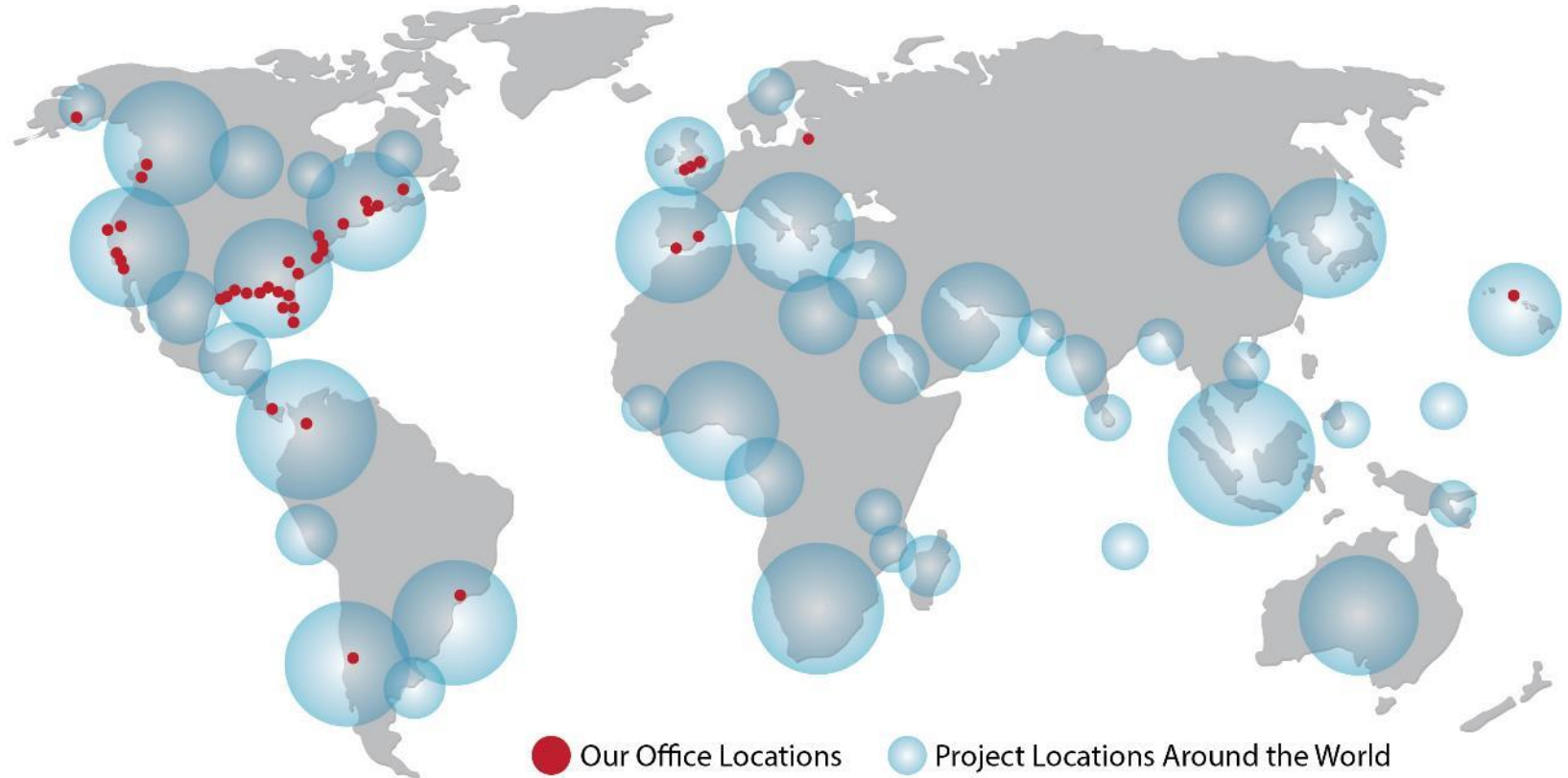## Still A Family Run Company 77 Years Later

80%
REPEAT BUSINESS

50 OFFICES WORLDWIDE

OUR MOTTO:
'TO BE THE **BEST**
NOT THE
BIGGEST.'

NO PROJECT
TOO SMALL

12,000+ PROJECTS COMPLETED

1000+ HIGHLY EXPERIENCED PORT
AND TRANSPORT PROFESSIONALS

● Our Office Locations   ○ Project Locations Around the World

Moffatt & Nichol Capabilities

Port Engineering

Coastal & Water Engineering

Transport Engineering

Port Planning

Commercial Advisory Services

Marinas and Cruise Terminals

Moffatt & Nichol Project Examples

Anaklia Port Concept, Republic of Georgia	Limassol Technical DD Project, Cyprus

Source: https://lsheavylift.com/2018/09/14/anaklia-port-construction-enters-a-new-phase/

Moffatt & Nichol Project Examples

Port of Beirut Masterplan 2017, Lebanon

London Gateway Port and Logistics Market Study, United Kingdom

Need For ROI Maximization Of Asset Intensive Ports & Terminals

Why 'Smart'?

› Physical **Space Is Limited**

› **Competitive** Pressure

› **Environmental** Imperative

› …

Need To Mitigate More Than 17.4 $ Billion Worth Of Inefficiencies In Supply Chains

Source: Navis 2015

Why "Smart"?

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Need To Reduce 3% Of Global GHG Emissions That Come From Shipping

Source: Fourth IMO GHG Study 2020

Why "Smart"?

› Physical **Space Is Limited**

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› **Environmental** Imperative

› …

Our Journey Of Digital Transformation

Accompanying Ports & Terminals With Technology And Domain Knowledge

FlexTerm BY MOFFATT & NICHOL

› Used in **+ 100 Simulation Projects Globally**

› Development of **Emulation & RT Mirroring capabilities**

› Progressive focus on **Several Value Chains** (Container Terminals, Bulk Terminals, rail facilities, cruise facilities, OSW, …)

2016

2005 › M&N expands offering by developing **FlexTerm™** as Simulation tool

2022 › FlexTerm™ as **Leading Platform For Simulation & Emulation** of complex logistics systems

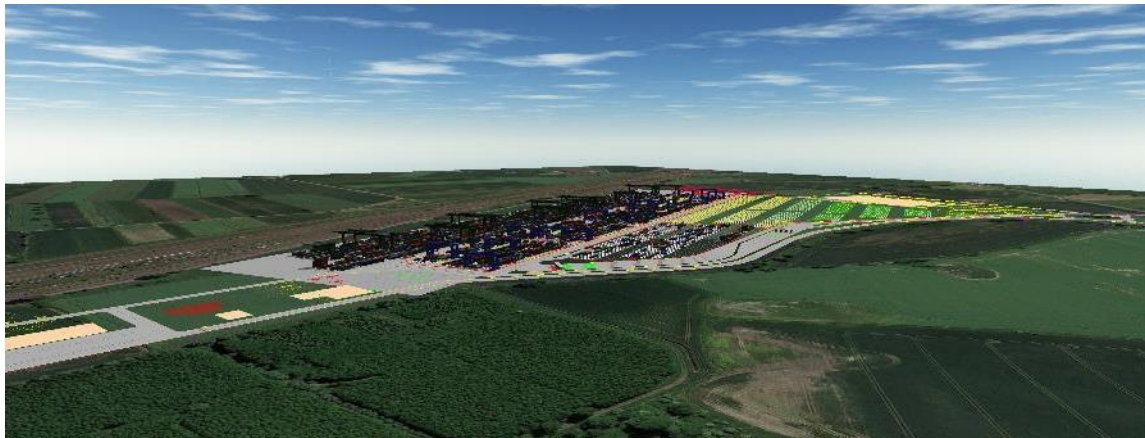› M&N invests in **NextPort™** to accelerate development of **SmartPort Product Solutions**

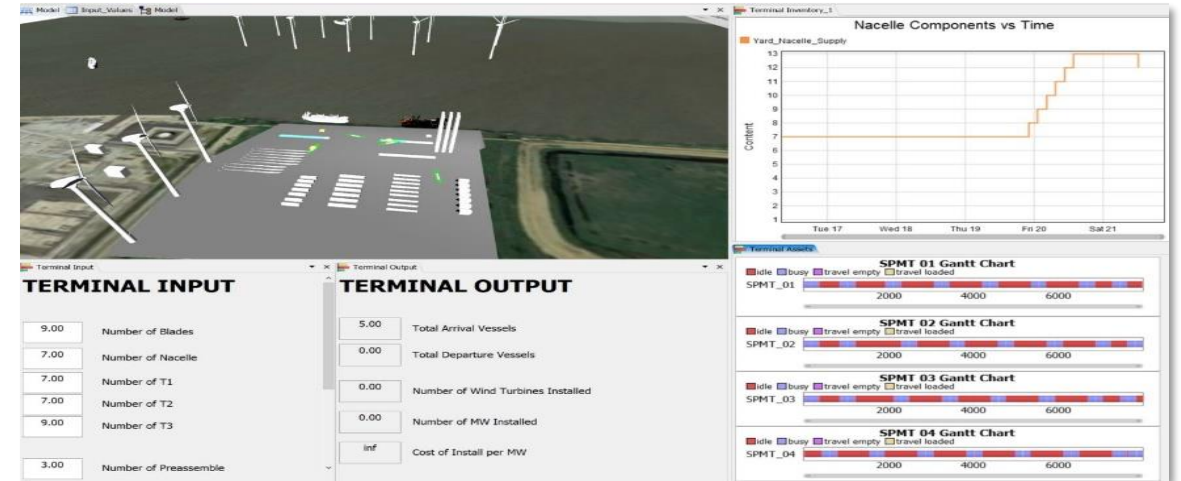**NextPort** BY MOFFATT & NICHOL

Our Journey Of Digital Transformation
Simulating & Emulating Complex Logistics Systems

FlexTerm™ Application at mixed cargoes. Source: Moffatt&Nichol ©
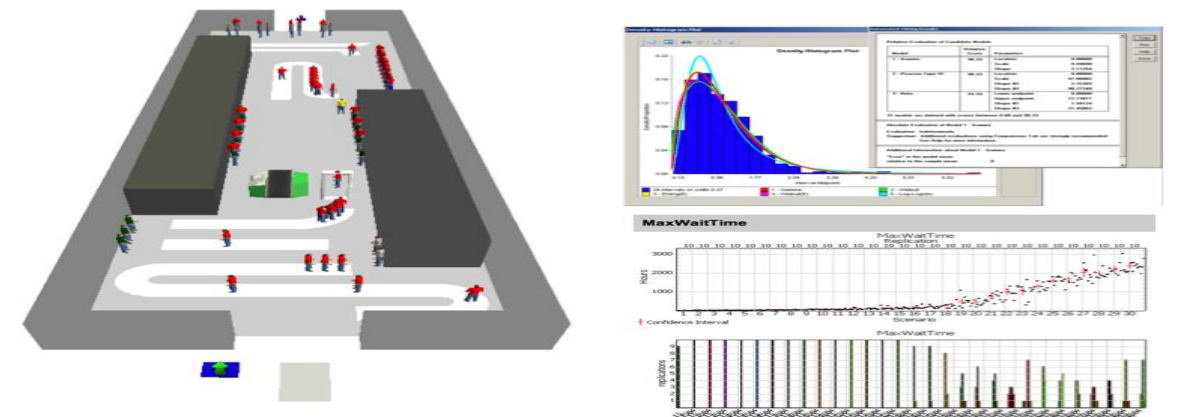

FlexTerm™ Application for OSW. Source: Moffatt&Nichol ©

FlexTerm™ application for rail container facility. Source: Moffatt&Nichol ©

FlexTerm™ Application at Passenger Terminal. Source: Moffatt&Nichol ©

Our Journey of Digital Transformation
Simulating & **Emulating** Complex Logistics Systems

TOS Emulation for testing and optimization using FlexTerm™. Source: Moffatt&Nichol ©
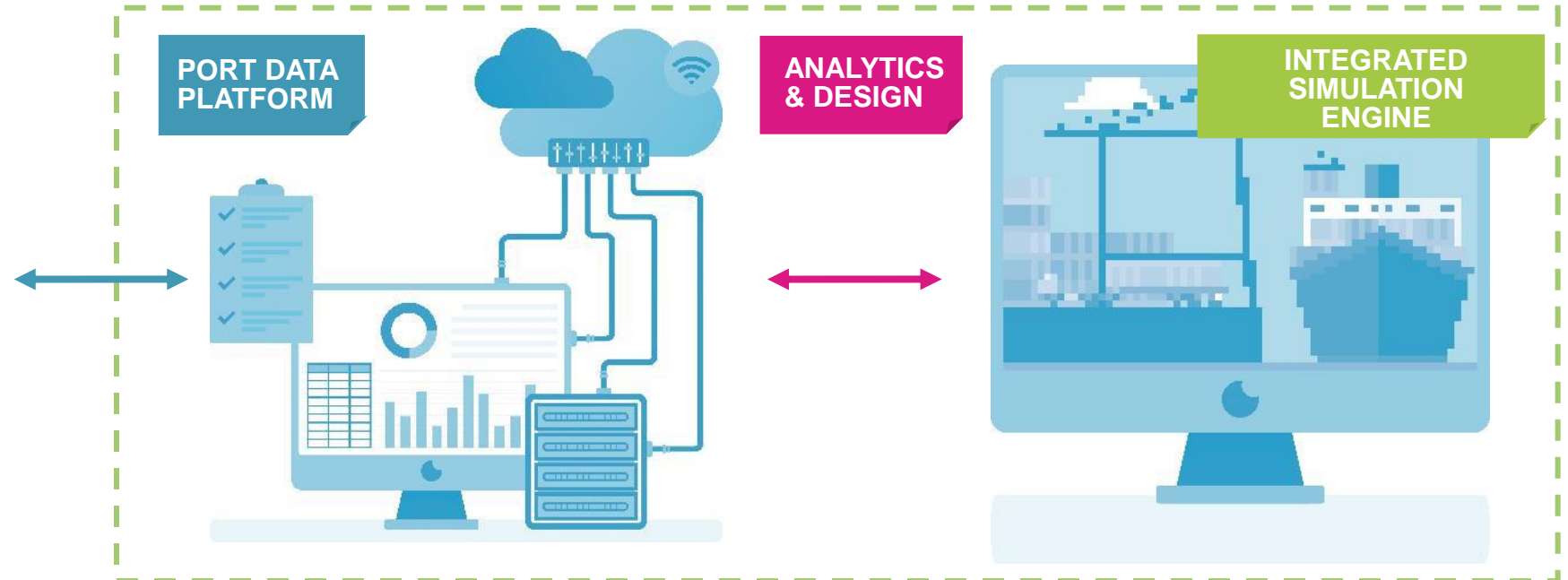
Our Journey Of Digital Transformation

Leveraging **Big Data, Digital Twinning, Simulation & AI** To Enhance Data-driven Decision Making

PHYSICAL INFRASTRUCTURE

DIGITAL TWIN PORTS
AS DIGITAL INFRA TO ENHANCE DATA-DRIVEN DECISION MAKING

PORT DATA PLATFORM

ANALYTICS & DESIGN

INTEGRATED SIMULATION ENGINE

UNDERSTAND Operational Processes And Physical & Information Flows

INGEST DATA from fragmented sources

MEASURE with basic analytics

OPTIMIZE with prescriptive intelligence

Our Journey of Digital Transformation

Connecting Data, Systems & Processes From Port Ecosystem To Enhance Data-driven Decision Making

Problem

Vessel arrives but at Port at time agreed with Terminal but there are **no resources available** (pilot, berth availability, tugs, etc.).

Impact: Economic (Vessel waiting; Terminals, landside transport and other related services need to adapt their planning with subsequent impacts); environmental (sub-optimal GHG emissions)

Solution

Prescribe **RTApbp** to port operators based on **RT & Historical Data** from port IT ecosystem & running of simulations for most optimal outcome.

Added Value: Assist port community stakeholders in Decision Making for Planning & Execution:

› Reduced Waiting Time

› Improved Asset Utilization

› Reduced GHG Emissions
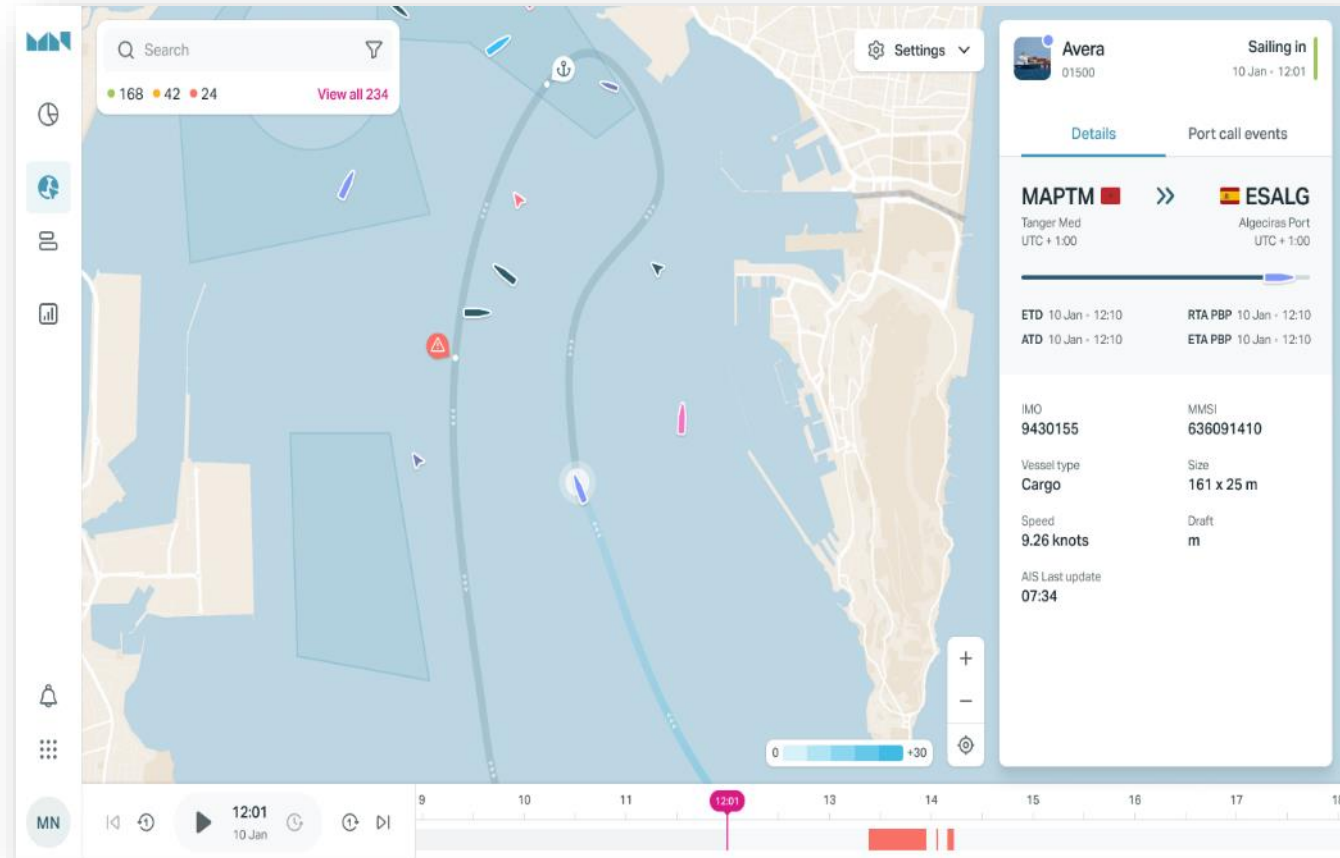
NextPort™ DigitalTwin. Source: Moffatt&Nichol ©

Our Journey of Digital Transformation

Leveraging the **value of data comes in a gradual way**

Transform Organization

5

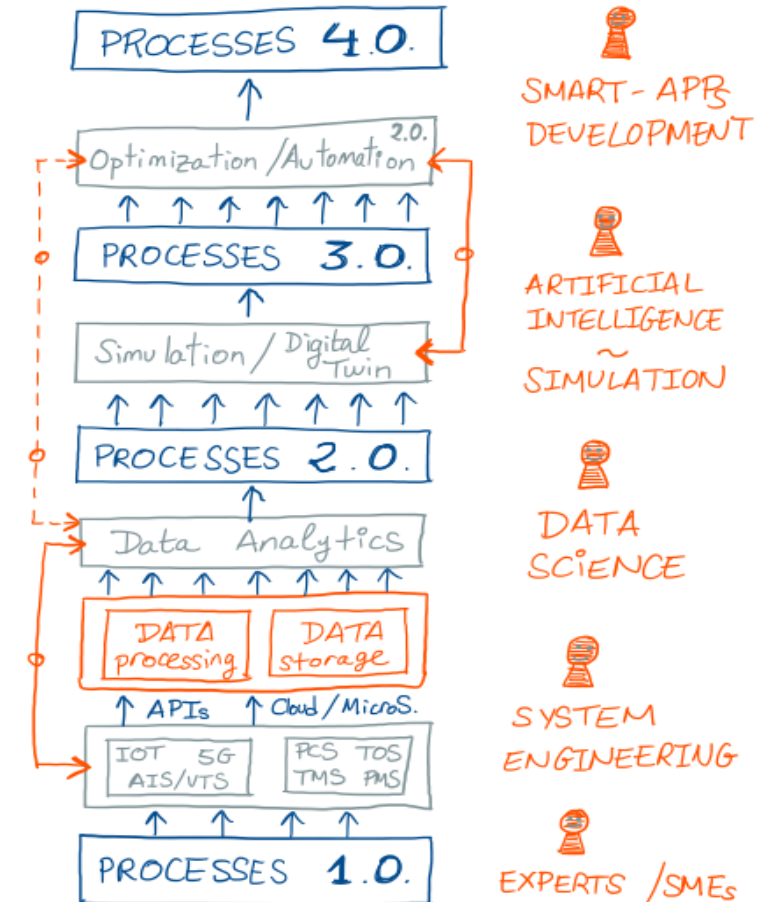› AI is real
› New ways of working
› Employees focused on high value work

Emerging Intelligence

4

› Consistent measurable results
› Smart systems know what to look for
› Data crosses silos

Data Tells a Story

3

› Multi source data merging
› Consistent view of info up & down the organization
› Measurable results emerge

Death by Dashboards

2

› Shadow data teams
› Big spend on reports, dashboards or BI systems
› Multiple, inconsistent sources of truth

Manual Data Drudgery

1

› Manuel reports
› Spreadsheets & PowerPoints

PROCESSES 4.0.

SMART-APPS DEVELOPMENT

Optimization /Automation 2.0.

PROCESSES 3.0.

ARTIFICIAL INTELLIGENCE ~ SIMULATION

Simulation / Digital Twin

PROCESSES 2.0.

DATA SCIENCE

Data Analytics

DATA processing   DATA storage

↑ APIs   ↑ Cloud / MicroS.

IOT 5G AIS/VTS   PCS TOS TMS PMS

SYSTEM ENGINEERING

PROCESSES 1.0.

EXPERTS /SMEs

Thank You

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