Transportation

AECOM

Simulation Models

Guiding Port and Rail Developments for Highest Value

Delivering a better world

We offer an array of in-house simulation models applicable to seaport transportation systems, marine terminals, channels, intermodal yards and rail lines; providing predictions of costs and benefits for alternative capital improvement scenarios and their environmental impact characteristics. These models allow convenient customization of inputs, outputs and graphics to suit clients' specific needs. We also offer standard commercial simulation models, thus providing a full complement of analytic services.

Learn more about our rail simulation brochure. Click here.

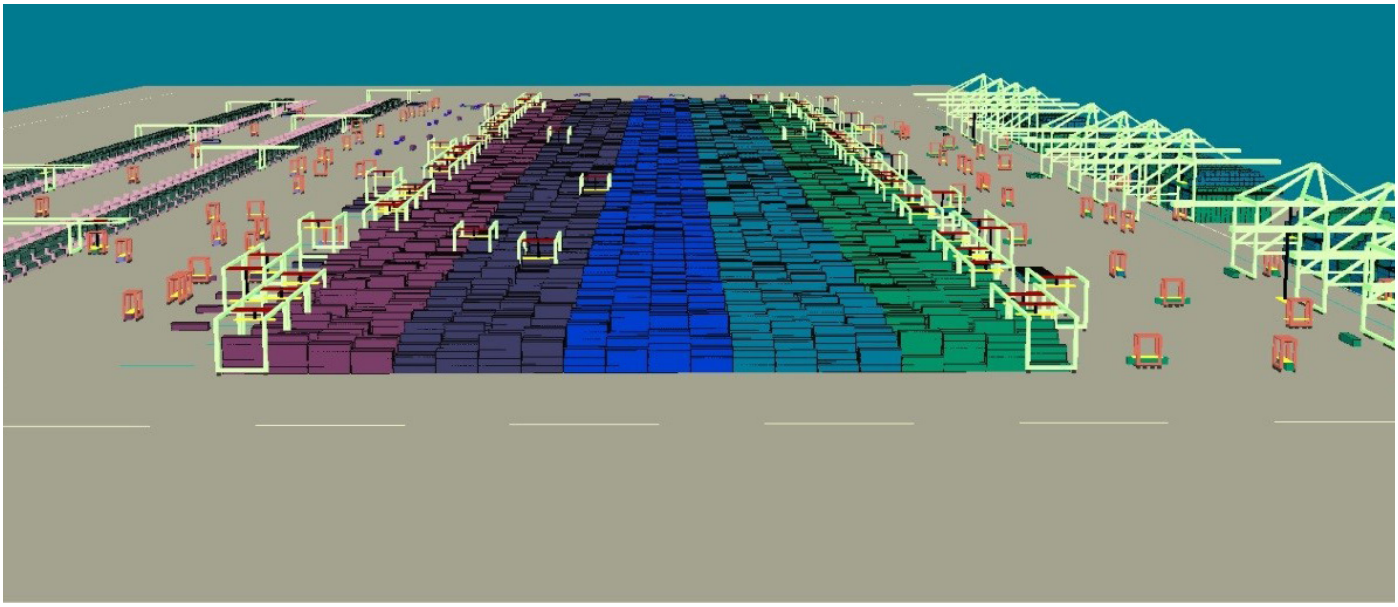
Cover:
Port of Jebel Ali, Dubai, United Arab Emirates

Main:
London Gateway Port, London, United Kingdom

Container Terminal Operations – General Marine Terminal Simulation (GMTS)

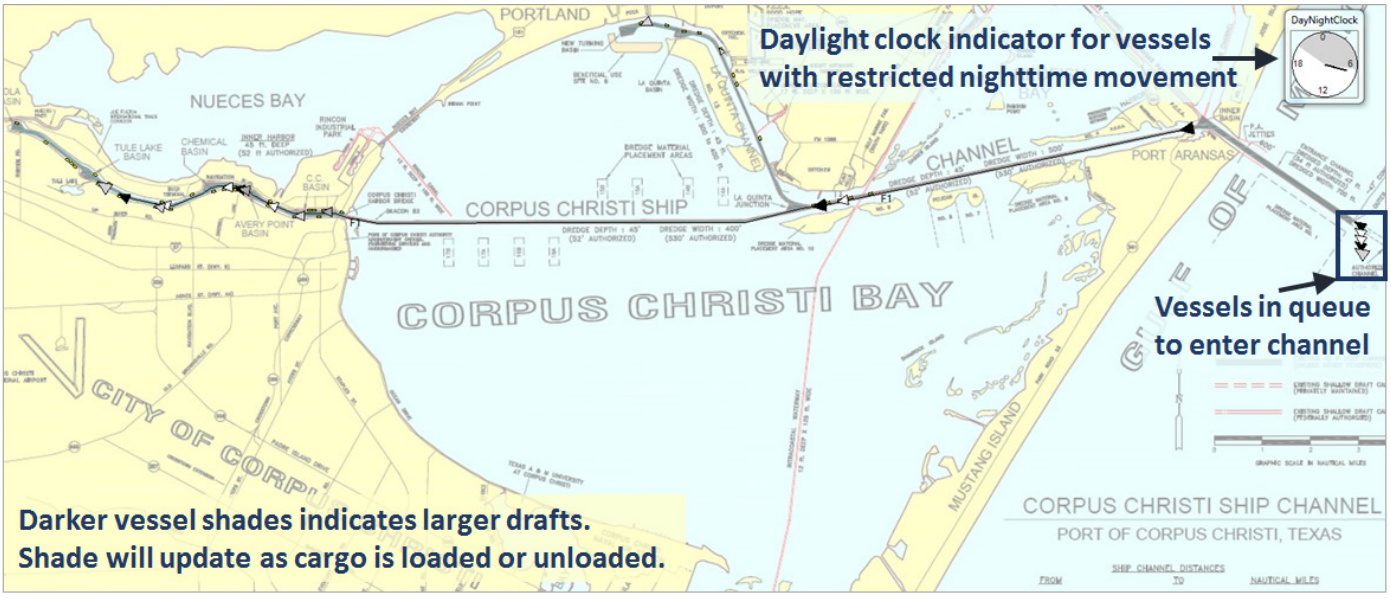
GMTS is a simulation model developed by AECOM and refined continually since its inception. It encompasses a high level of detail, including equipment movement, on- and off-terminal vehicle activity, and all terminal activity down to the individual container and spreader movement level.

GMTS enables analysis of vast arrays of input parameters and generates a variety of detailed and customizable output reports on everything from productivities, container inventories, electrical usage, and air emissions, among many others.



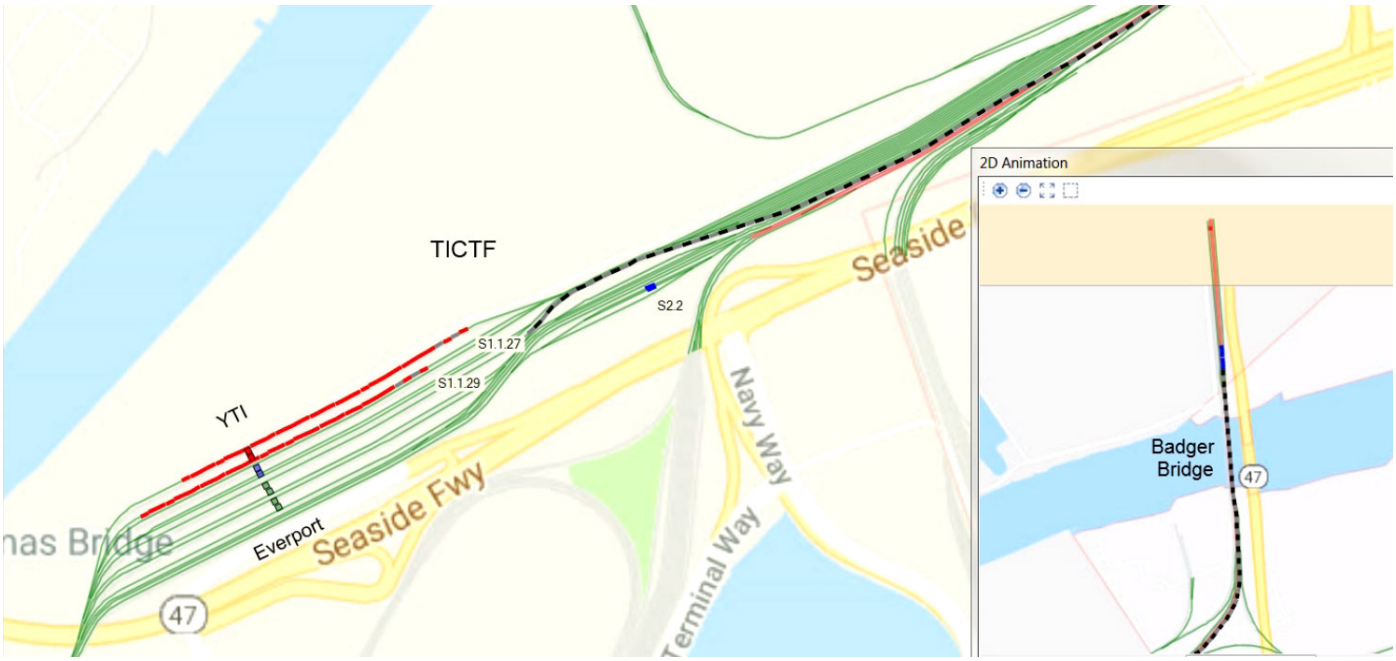
Harbor and River Channel Operations – Vessel Network Model (VNM)

AECOM's VNM evaluates the transportation capacity of harbor channels, river systems, ferry passengers, and or freight networks. Vessel networks can range from small scale harbor capacity studies to global distributions. VNM can accommodate a wide variety of dynamic conditions such as vessel fuel cost vs. operating speed, vessel draft vs. cargo loaded, tidal range, darkness, and weather closures.



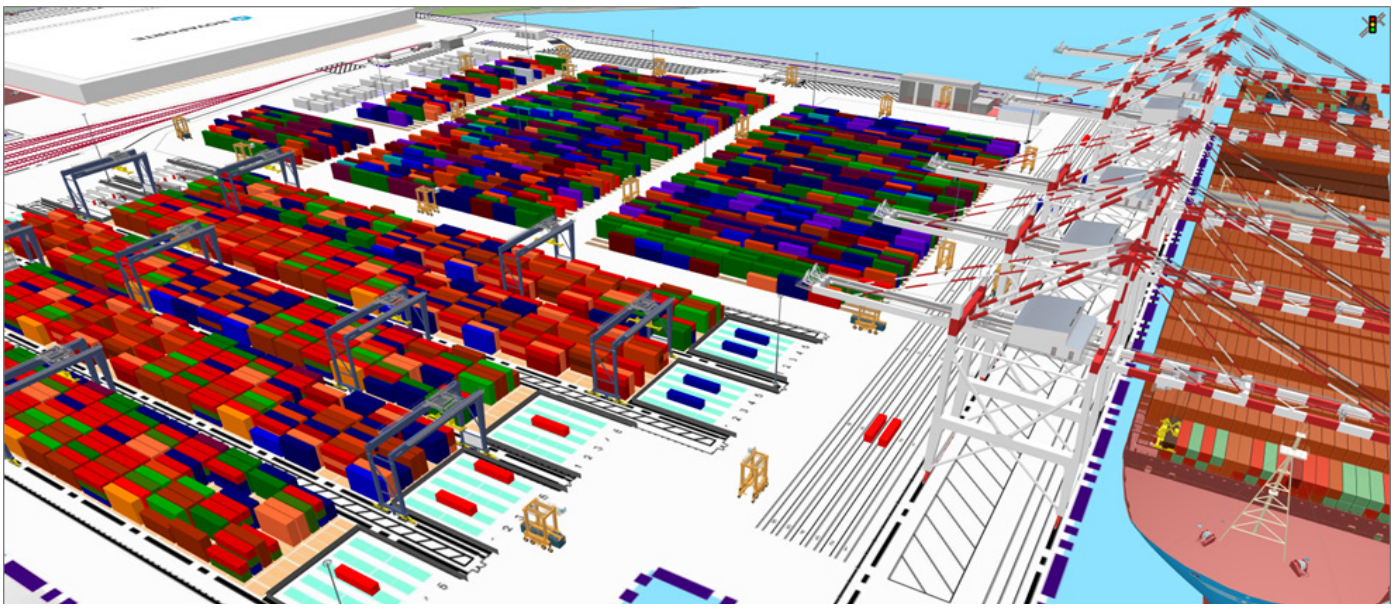
Rail Networks & Intermodal Yards – RailOps

RailOps allows explicit and realistic representation of the details of rail operations from wide area networks to local area switching, providing the flexibility to model any operation from metro to heavy freight. RailOps provides animations of train activity in both scaled and schematic mode and supports evaluations of proposed infrastructure and operational plans on facilities and networks of any size or complexity. The model can support any train configuration including any combination of railcar types and dimension, as well as any type and combination of locomotives such as mainline vs. switching.



Enhanced 3-D Graphics & Traffic Analysis – PTV Vissim

PTV Vissim is a commercial software used to analyze the capacity of terminal gates or roadway systems near freight terminals, as well as analyze on-terminal vehicle congestion issues. It has excellent graphics and can be used to develop 3D visualizations of terminals to help clients better understand the look of potential development options. among many others.

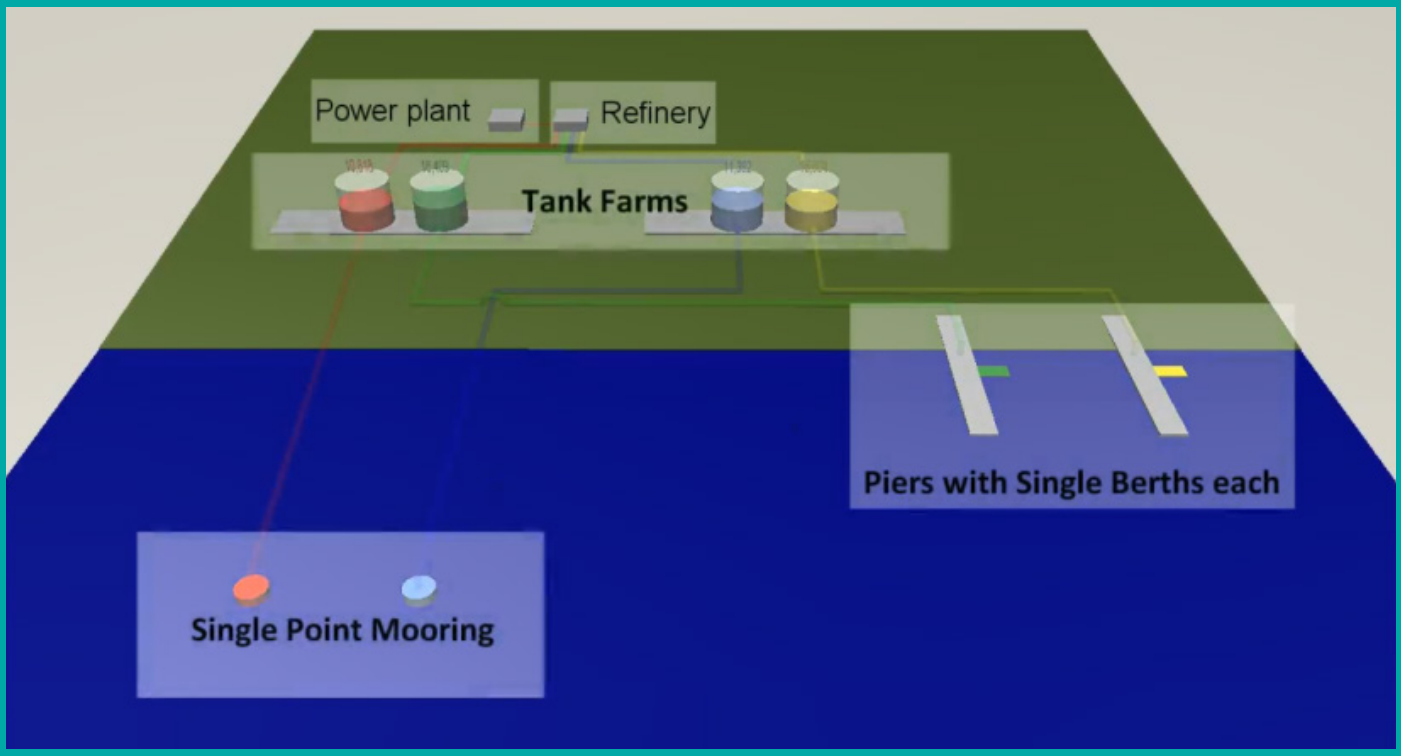


Berth Operations – Bertha

BERTHA was developed in-house by AECOM to analyze berth activity and container yard inventory patterns. BERTHA offers a powerful advantage over spreadsheet models as it can easily analyze such impacts as vessel on-time performance, adding or raising cranes, increasing vessel sizes and related container yard inventory peaking, or congestion effects on capacity and service levels.

Bulk Terminals – BulkSim

BulkSim is AECOM's proprietary software used to simulate the operations at a dry or liquid bulk facility. The model is capable of simulating both import and export operations. Any commodity type (grains, minerals, oil, etc.) can be simultaneously imported or exported through various modes including vessels, barges, pipelines, trucks, and rail. Any mode of storage from tanks to piles to warehouses can be modeled as well.



AECOM Simulation clients and applications

Client Categories Served

- Port Authorities
- Main line rail companies
- Port rail lines
- Container, Liquid Bulk, & Dry Bulk Terminal Operators
- State/Regional/Local Transportation Agencies
- Federal Transportation Agencies
- Environmental Agencies
- Equipment Manufacturers
- Terminal Software companies

Port Owners

- Port of Vancouver
- Port of Los Angeles
- Port of Long Beach
- Port of Oakland
- Port of New York New Jersey
- Port of Corpus Christi
- Port of Jamaica
- Durban Port
- Pusan Newport

Terminal Operators

- TraPac
- TTI
- Ports America
- Hong Kong International
- DP World
- APM Terminals
- CMA CGM

Main:
Tema Port Expansion, Africa

Rail Companies

- BNSF
- Canadian Northern Railway
- Union Pacific
- CSX
- California State Rail Plan
- Hyperloop 1 Study
- Altamont Corridor Express (ACE)
- Capacity, Throughput, & Operations Analyses
- Capital Improvement Program cost basis
- O&M cost basis
- Terminal & gate layout optimization
- Terminal automation scenarios & analyses of new or proposed technologies
- Channel capacity and planning
- Equipment options & fleet sizing
- Labor force size analyses
- Tankage storage & transfer planning
- Bulk storage & transfer planning
- Berth operations, infrastructure need, & capacity
- Air emissions analysis
- Electrical demands for terminals
- Railyard sizing and layout optimization
- Due Diligence analyses

About AECOM

AECOM is the global infrastructure leader, committed to delivering a better world. As a trusted professional services firm powered by deep technical abilities, we solve our clients' complex challenges in water, environment, energy, transportation and buildings. Our teams partner with public- and private-sector clients to create innovative, sustainable and resilient solutions throughout the project lifecycle — from advisory, planning, design and engineering to program and construction management. AECOM is a *Fortune 500* firm that had revenue of $16.1 billion in fiscal year 2025.

Learn more at aecom.com.