

Seeing the terminal come to life – from truck to vessel

Introducing THE TWINBRIDGE

Explaining how Camco Technologies transforms data into operational insight, and why terminals in South Asia are the first to be born digitally.

In modern container ports, everything is measured, but rarely truly seen. Hundreds of systems record what happens—cranes, trucks, gates, sensors—but each from its own world. Camco Technologies' real-time digital twin, THE TWINBRIDGE, changes that fundamentally. It brings together all signals and data streams in one dynamic and interactive view of the terminal. It is a digital mirror that literally shows what is happening, second by second. The idea sounds simple. All movements, images and data are combined in real time into one shared visual environment. Behind that simplicity, however, lies a deeply integrated network of technologies. Camco's OCR cameras, kiosks, IIOT sensors (Industrial Internet of Things), smartphone apps and location systems provide raw data; coupling with the Terminal Operating System (TOS) adds context and planning. That continuous data stream forms the beating heart of the operation. Not as a report or dashboard, but as a living projection of reality. "The power of this approach," says Arne Vandeginste, Product Development Lead at Camco, "is that you no longer have to sift through the numbers — you literally watch how a terminal behaves. Once you see movement, you begin to understand behaviour."

The terminal in motion

THE TWINBRIDGE is an interactive dashboard that adds an augmented digital reality to the physical terminal as it operates. Every movement appears on screen immediately. In control rooms, the visualisation replaces dozens of camera feeds. Operators can zoom in, move along, or follow the entire flow in a single environment that refreshes ten times a second. The details are impressive. Container colours match, and truck, spreader and crane movements are fluent. Every detail looks real. That shared view creates calm, speed and safety. Decisions are made faster because everyone is looking at the same reality. For the planner, it means no longer having to switch between systems. For the operator on the ground, it means fewer blind spots and a safer working rhythm.

The power of knowing where everything is

Every movement you see in THE TWINBRIDGE starts with one essential element: knowing exactly where everything is. That's the job of the CAMCO Real-Time Location System (RTLS) — the invisible network that gives the terminal its sense of direction. "Real-time location is the primary foundation of a digital



THE TWINBRIDGE in the control room. PHOTO: CAMCO

twin," says the RTLS engineer who introduced the technology at Vizhinjam. "Because without trusted positioning, the twin simply cannot operate." Every piece of container-handling equipment is fitted with GNSS and UWB antennas that broadcast their identity and position ten times per second, even under a crane. With real-time X, Y, and Z coordinates, THE TWINBRIDGE can follow every move with absolute precision. While some TOS offer basic 3D visualisation tools, they lack the real-time dimension. Their data updates only at

specific handover points. That means they miss the details that matter: the trajectory between those points, the spreader moves, twistlock activity and telematics data.

THE TWINBRIDGE

leverages THE BRIDGE, Camco's unified platform that brings together operational intelligence from all core systems, from gate to yard to quay. It is powered by several special-purpose engines, such as RTLS and OCR, each contributing their specific layer into the whole. Each engine adds its own truth to the picture. Here, identification and location signals are validated, enriched with TOS data, and delivered to THE TWINBRIDGE as one coherent, live reality. The result? Not just a set of coordinates, but a fully verified, living digital twin — a real-time reflection of the terminal in constant motion.

Behind the scenes

Behind every movement on the terminal lies a world of data — and THE TWINBRIDGE makes it visible. With a single click on any container, a complete story unfolds: OCR images, damage and seal status, IMDG information, and a full timeline of movements from gate to vessel.

For terminal trucks and straddle carriers, THE TWINBRIDGE reveals not only the driver name and container details, but also current and next job assignments, giving full operational transparency at a glance. Cranes go one step further, adding

The visual representation of operations enables the detection of problematic and inefficient patterns, something that people are inherently good at

spreader data and precise lift information to the mix.

THE TWINBRIDGE even lets you follow kiosk and VMT screens in real time, and access vessel data up to bay-row-tier location. "In the world of THE TWINBRIDGE, nothing goes unseen", explains Camco's CEO Jan Bossens. "Every asset, every process, every piece of data is connected, creating a single, living source of truth for the entire terminal. Not only for the operators, but also for decision makers who get a better understanding of how the terminal performs as a flow, not a set of consecutive events."

From insight to prediction

Today, THE TWINBRIDGE offers a real-time situational awareness with playback. The next step is looking to the future, predictive insight. By linking the live data stream to algorithms and machine learning, THE TWINBRIDGE will soon be able to recognise patterns, flag deviations and propose actions before a problem arises. That evolution—from visualisation to intelligence—is already underway. The next versions will integrate rail and road data, connect more deeply with TOS job management and provide tools for automated exception handling. In this way,

THE TWINBRIDGE grows from a visual partner into a predictive co-pilot.

A new way of seeing

THE TWINBRIDGE is more than a technological innovation. It changes the perspective, from fragmented data to one shared awareness of reality. Ports like Vizhinjam and Colombo already show that future. Infrastructure and intelligence grow together there, with automation as the foundation and human intuition central. When a terminal can see itself move, it can learn. And once it learns, it can think ahead.

The power of visual thinking

THE TWINBRIDGE is built on a massive foundation of data — data that will soon power AI-driven tools designed to boost terminal performance and simulate future outcomes through heatmaps, advanced scenario modelling and predictive simulations.

Even today, without advanced AI, the visual power of THE TWINBRIDGE is already transformative. Its visual rollback function enables step-by-step analysis of operations — whether tracing a crane's movements or resolving a traffic deadlock in the yard. Human brains are naturally wired to spot patterns, trends, and anomalies far faster through visuals than through columns of numbers. A long dashboard takes time to interpret; a real-time visual display encourages intuitive "what-if" thinking and reveals insight instantly, showing not just that something is wrong but revealing why. That's the real advantage of THE TWINBRIDGE. It turns information into understanding. The next step is using the same data to simulate "what-if" scenarios visually.

The human factor

"It becomes quieter in the control room," says a supervisor in Colombo. "Because once the flow is visible, less clarification is needed." THE TWINBRIDGE does not replace people. It strengthens their judgement. By giving planners, supervisors and technicians one shared visual reference point, duplicate work disappears, and trust grows. Instead of checking data, teams can focus on the flow and safety of the operation.

The ability to replay movements later also makes the system a valuable learning tool. Supervisors will be able to reconstruct incidents or analyse delays using real situations as examples. "Automation improves operational safety and efficiency," says Vandeginste. "People shift from manual reaction to oversight and decision-making. It's like having better eyes and faster reflexes."

South Asia as a testbed

The first terminals to work fully with Camco's THE TWINBRIDGE are in South Asia. In Vizhinjam, India's first deep-sea transshipment port, Camco's automation layer—from gate to quay—forms the basis of THE TWINBRIDGE. The port could already be monitored remotely before the first vessel had docked. Further south, in Colombo (Sri Lanka), there is a similar system at CWIT. There, THE TWINBRIDGE functions as a compass that visualises traffic flows and brings bottlenecks to light. Both projects show how Adani Ports, the group behind both terminals, is choosing a future in which terminals are not only efficient, but also transparent and predictable. South Asia thus became the natural starting point: new infrastructure without legacy layers, with room to start fully digital. But the technology is universally applicable. THE TWINBRIDGE can just as easily be rolled out in existing terminals, coupled to local systems or TOS environments from other suppliers.

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