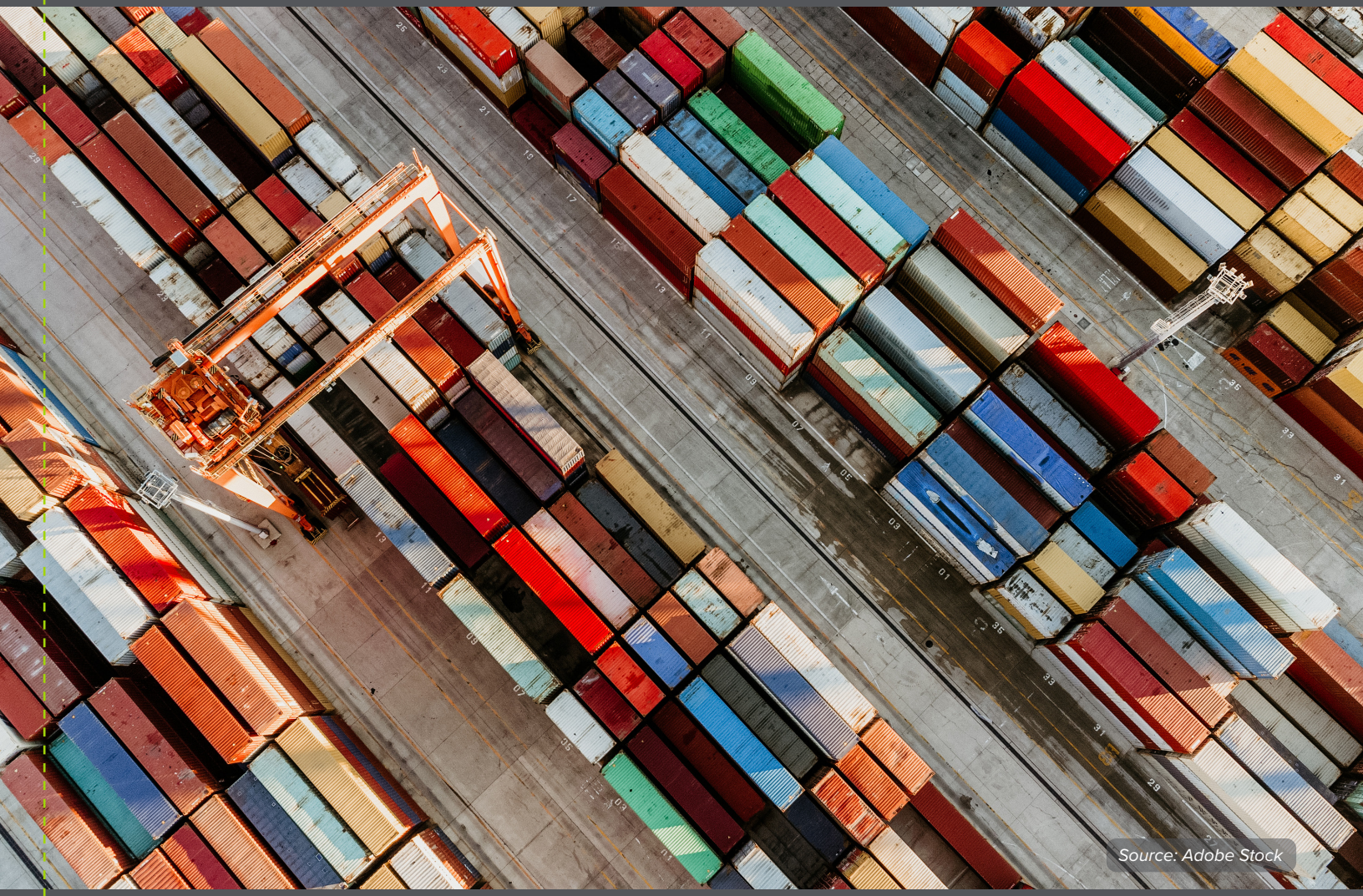
Customer Case Story

Container Logistics with Intelligent GNSS Control

October 2023



Source: Adobe Stock

Today container terminal operators at ports face a highly complex operating environment to provide maritime services including container handling, cargo storage and management, freight forwarding, and customs clearance. These modern terminals have extensive infrastructure, including buildings, equipment, cranes, and straddle carriers[1], to make container handling safe and efficient. In this customer case story, learn how JAVAD GNSS solutions enabled ALLSAT Gmbh, its German distribution partner, to deliver an innovative solution for one of the largest container companies in the world.

[1] Straddle carriers are specialized container handling vehicles at ports with the ability to pick up large containers and flexibly move them to a truck, train, or other container stack.

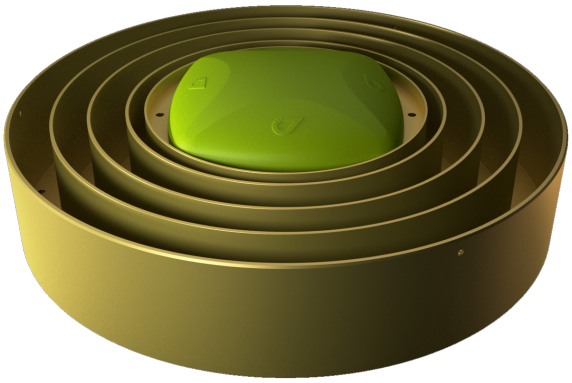
Challenge

In 2022, ALLSAT GmbH applied a new digital twin concept to address the challenge to supply and support the commissioning of several hundred JAVAD GNSS rover solutions at three international seaports for equipping straddle carrier vehicles.

For the introduction of a digital twin in the complex environment of a container terminal, it was necessary to obtain GNSS positional data for moving straddle carriers with a high degree of accuracy in real time. This would enable important control and documentation processes via a terminal information system.

Straddle Carrier in operation at port container terminal. *Source: Canva*

Delta-3S - Multi-Purpose GNSS Receiver | *Source: JAVAD GNSS*



RingAnt - GNSS Antenna (snow-cone optional) | *Source: JAVAD GNSS*

Solution

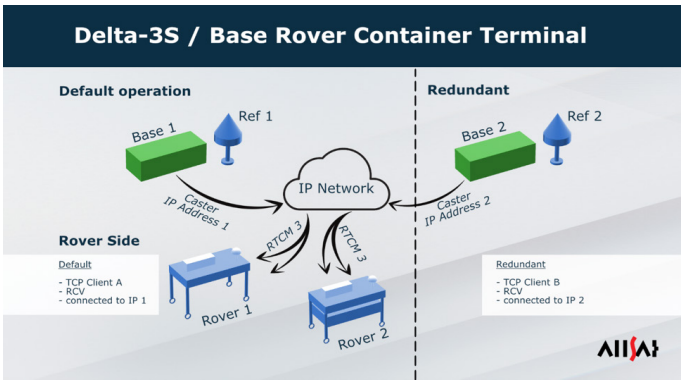
The deployment of a geodetic conceptual design, integrating JAVAD GNSS Delta-3S receiver, RingAnt G5T and GrAnt-G5T antennas to deliver precise surveying of two GNSS reference stations per port. And the commissioning of the system on the mobile vehicles, all from a single source.

A concept redundant reference stations solution with two redundantly operating reference stations. These send out GNSS correction data for the RTK application for all GNSS (GPS, Galileo, GLONASS, BeiDou) on different IP addresses/radio frequencies, which can be processed in parallel by all rovers. With corrections from one reference station providing reliable high performance.

GNSS reference stations operating in parallel offer two advantages:

1. A comprehensive fallback level is available in the event of a reference station failure
2. Rover performance (reliability, speed, and accuracy) is greatly improved under the demanding measurement conditions of a port terminal with frequent signal shadowing and multipath influences.

The JAVAD GNSS ASIC with 874 channels and parallel processors used in the JAVAD RTK rovers makes it possible to receive data from both correction sources in parallel. This importantly provides enough GNSS signals to operate reliably under such difficult signal conditions.



Base / Rover container terminal. *Source: ALLSAT*

Outcome

Fast time to value: implemented in only a few weeks from initial idea to verification and commissioning due to the strategic partnership of JAVAD GNSS and ALLSAT to identify ways to meet individual customer requests.

High reliability and availability: the redundant reference stations and the JAVAD GNSS multi-base RTK provide higher reliability and by using the signals from four available GNSS more availability to provide reliable continuous operation.

Sustainability delivered: with the firmware updates available for life, the customer can rely on this base rover solution for the next ten years.

ALLSAT Gmbh Michael Schulz in front of the GNSS reference station antenna with JAVAD hardware. *Source: ALLSAT*

About ALLSAT Gmbh

Since 1991 ALLSAT GmbH has been a leader in the sector of GNSS applications providing broad and deep engineering geodetic and electronic expertise to diverse customers. Since 1995 for sophisticated and innovative solutions its long-term distribution partnership with JAVAD GNSS has delivered the right solution for every customer challenge.

www.allsat.de/en/

JAVAD GNSS
900 Rock Ave
San Jose, CA, USA 95131
(408) 770-1770
www.javad.com
sales@javad.com

About JAVAD GNSS

JAVAD GNSS, headquartered in San Jose, CA designs, engineers, and manufactures products using multi-constellation, multi-frequency GNSS technology solutions for positioning, navigation, timing, survey, and aerospace industries. Its receivers utilize the latest GNSS technology delivering centimeter-level positioning and are recognized for their unparalleled performance, high-level security, and resilience in challenging environments. JAVAD GNSS has built many generations of GNSS receivers and full-featured office post-processing real-time software for high-precision Geodesy and GIS applications.

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