

Real-Time Wind Monitoring for Safe Terminal Operations at JNPA, Maharashtra



INTRODUCTION

Nhava Sheva Freeport Terminal Private Limited (NSFT), a joint venture between JM Baxi Ports & Logistics and CMA Terminals (part of the CMA CGM Group), operates at Jawaharlal Nehru Port (JNPA), India's largest and premier container gateway, in Maharashtra.

To support safe and efficient terminal operations, NSFT deployed an Oizom Weathercom Automatic Weather Station (AWS) to provide real-time monitoring of wind speed and direction, rainfall, and ambient meteorological conditions.

The system captures readings every 3 seconds and streams continuous weather data to a dashboard customised on Envizom for NSFT's operations team, giving the terminal live visibility of the environmental factors that directly influence day-to-day operational decisions.

**NHAVA SHEVA
FREEPORT TERMINAL**

01 Weathercom
AWS Deployed

05 Parameters
Per Station

24/7 Real-time Data
To Envizom

THE CHALLENGE

At a container terminal, weather is a critical operational factor. Wind conditions directly impact the safety of container handling, equipment use, and personnel working at height or on the quay.

Wind behaviour near a port is especially unpredictable. A reading that is even a few minutes old may no longer reflect the conditions a crane operator or mooring team is actually facing. Operations teams therefore require immediate, high-frequency, on-site measurements rather than delayed or remote weather reports.

Before deployment, NSFT needed a weather monitoring approach that could:

- Measure wind speed and direction in real time directly at the terminal, with a sampling frequency fast enough to capture sudden gusts and directional shifts as they occur.
- Provide continuous, reliable data around the clock to match the terminal's 24/7 operating rhythm.
- Capture supporting meteorological context; rainfall, temperature, humidity, and pressure, alongside wind data.
- Present critical information clearly and quickly to the operations team through an interface built around how the terminal actually works.
- Withstand the demands of a coastal port environment with continuous, unattended operation.

WHY OIZOM WEATHERCOM

A weather monitoring solution for NSFT had to deliver accurate, real-time wind data in a harsh marine environment, and present it in a form the operations team could act on immediately.

Oizom's Weathercom was selected on these grounds, supported by Oizom's willingness to adapt the solution to the terminal's specific operational requirements.

Weathercom met the project's needs through:

- **High-frequency sampling, with data readings every 3 seconds.** Because wind speed and direction near a port change abruptly, the 3-second reading interval ensures the operations team sees gusts and directional swings the moment they develop.
- **Multi-parameter monitoring in a single station,** measuring wind speed, wind direction, rainfall, and THP (temperature, humidity, pressure) together, without the cost and complexity of separate instruments.
- **Real-time data delivery,** providing the operations team with continuous visibility into evolving wind conditions.
- **A customised dashboard on Envizom** that provides a clear, intuitive interface for accessing critical weather information quickly. Envizom's wind widget, a live, at-a-glance display of current wind speed and direction, has become the operations team's most-used feature, sitting at the centre of their day-to-day monitoring.
- **Field-grade reliability** suited to continuous, unattended operation in an exposed coastal port environment, with an IP66 Enclosure for endurance against harsh weather conditions.

THE DEPLOYMENT

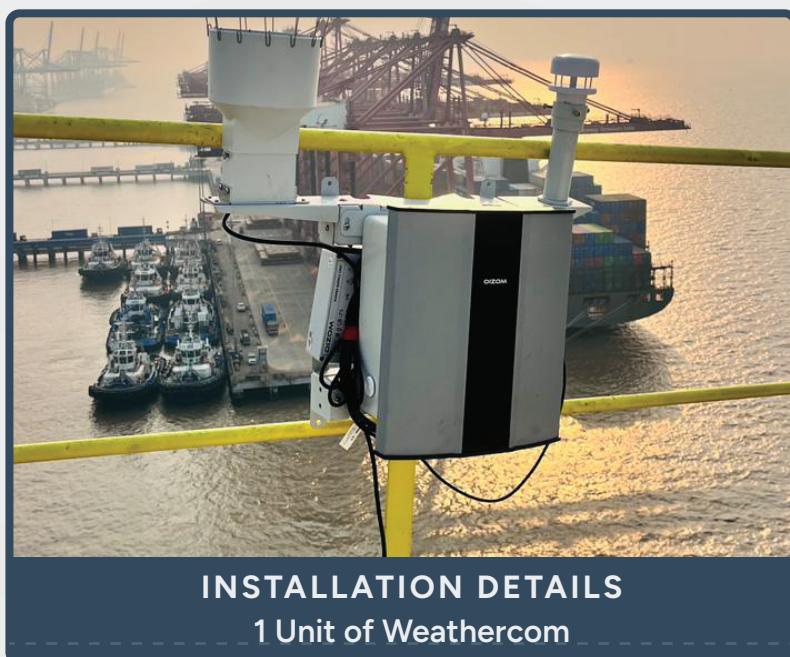
A Weathercom AWS was installed at the terminal, where the station samples on-site conditions every 3 seconds and transmits data in real time to a dashboard tailored to NSFT's operational needs.

This high-frequency stream of readings from the ultrasonic wind sensor feeds directly into how the terminal runs from the time of installation. On the marine side, live wind speed and direction inform decisions on ship movement, including assessments of conditions for vessel berthing, unberthing, and mooring, where sudden crosswinds can affect a vessel's approach and hold alongside the quay.

On the yard and quay side, the same readings guide cargo handling: crane operators and supervisors track live wind behaviour to judge when container lifts can proceed safely and when rising gusts call for operations to be slowed or paused.

The teams monitor live wind behaviour, primarily through Envizom's wind widget, alongside supporting meteorological parameters, with the station monitoring:

CATEGORY	PARAMETERS MEASURED
Wind	Wind Speed, Wind Direction
Precipitation	Rainfall
Meteorology	THP (Temperature, Humidity, Pressure)



RESULTS

The system has been operating reliably and accurately since commissioning, providing continuous weather data that supports safe and efficient terminal operations. Real-time visibility of wind conditions, refreshed every 3 seconds, has significantly improved NSFT's ability to monitor environmental factors and make informed operational decisions.

KEY OUTCOMES

Real-Time Wind Visibility

- Continuous, accurate measurement of wind speed and wind direction directly at the terminal, with readings every 3 seconds.
- Live awareness of sudden gusts and directional shifts, critical in a port environment where wind behavior is highly unpredictable, enabling timely operational responses.

Weather-Informed Ship Movement and Cargo Handling

- Live wind data supports decisions on vessel berthing, unberthing, and mooring, helping marine teams time ship movements around safe wind windows.
- Crane and yard teams use real-time readings to manage container handling, proceeding, slowing, or pausing lifts based on actual on-site wind conditions rather than estimates or delayed reports.

A Dashboard Built Around the Terminal

- A customized Envizom interface tailored to NSFT's specific operational requirements, with configured alerts when wind crosses the threshold.
- The wind widget, the team's most-used Envizom feature, displays live wind speed and direction at a glance, allowing the operations team to read current conditions in seconds.

Enhanced Operational Awareness

- A robust weather monitoring solution that has strengthened the terminal's overall operational awareness and efficiency.

IMPACT

By bringing real-time weather intelligence directly to the terminal, with readings every 3 seconds and live visibility via Envizom's wind widget, NSFT has turned wind from an operational uncertainty into a continuously measured, clearly presented input for decision-making.

The deployment of an automatic weather station delivered a robust and effective monitoring solution that enhances operational awareness, supports the safety of people and equipment, and improves efficiency at one of India's most important container gateways.

TESTIMONIAL

The real-time visibility of wind conditions has significantly improved our ability to monitor environmental factors and make informed operational decisions.

- Head of IT Department, NSFT

Oizom specializes in real-time environmental monitoring solutions designed to help organizations measure, manage, and improve environmental performance. Our comprehensive portfolio includes air quality, weather, noise, and emission monitoring systems, powered by advanced sensor technology and cloud-based analytics. Trusted across industries, governments, and smart city initiatives, Oizom's solutions enable continuous monitoring, regulatory compliance, and actionable environmental intelligence.