CASE STUDY - SPATIAL COMPUTER VISION & INFRASTRUCTURE ACTIVITY TRACKING

How Our Refinery Tracking Bot Protected $520,000 in Logistics Revenue

computer vision that tracks refinery loading bays in real time so your fleet never wastes time sitting in a bottleneck

CLIENT BRIEF **Regional logistics & distribution firm** — petroleum product transport | Single refinery terminal monitored | Near real-time data feed | Supply Chain Due Diligence

THE CHALLENGE

Paying Massive Overtime and Penalties Because You Can't See Inside the Refinery Gates

A regional logistics firm secured a high-stakes contract to transport refined petroleum products from a major coastal refinery to local distribution hubs. To maintain margins, their fleet needed to sync perfectly with the refinery's active loading bays. Three critical blindspots stood in the way.

1 **THE LOADING BAY BLINDSPOT**

The refinery operated multiple overhead loading gantries but frequently closed specific bays for unannounced maintenance. Trucks routinely queued for hours with no visibility into which racks were functional, triggering devastating operational delays.

2 **THE VISUAL CHAOS OF THE TERMINAL**

Standard CV models completely failed to monitor the terminal yard. Generic detectors confused active fuel tankers with stationary storage units, background piping, and maintenance vehicles — producing highly inaccurate congestion data.

3 **THE STALE MANIFEST LAG**

Relying on the refinery's gate-log paperwork meant receiving congestion data hours after it occurred. The logistics team was forced to route their fleet on outdated information, making real-time dispatch decisions impossible.

> *"Every hour our trucks sat idling in a bottlenecked refinery yard, we faced contract penalties and driver overtime that threatened to wipe out half a million dollars in quarterly profits."*
>
> — Operations Director, Regional Logistics Firm

PRIOR SYSTEM LIMITATIONS

Loading Bay Status Accuracy	58%
Vehicle Classification Accuracy	51%
Real-Time Data Feed	0%

Overhead feed from a coastal petroleum terminal. Loading bay activity classified across full gantry footprint.

THE SOLUTION

A Real-Time AI Pipeline That Maps Terminal Capacity Without Asking Refinery Crews

The logistics firm deployed a custom spatial computer vision pipeline to analyze high-frequency aerial and satellite feeds — completely bypassing the refinery's broken manual reporting systems.

ACTIVITY-STATE MODELLING

Monitored precise positioning and dwell-time of transport trucks underneath loading gantries. Automatically classified whether a bay was actively pumping, blocked by a stalled vehicle, or entirely offline.

DYNAMIC CONGESTION ALERTING

Fed real-time asset status directly into the contractor's dispatch software, converting raw pixel data into immediate route-optimisation metrics and predictive slot availability.

BUSINESS IMPACT

From supply chain blindspots to $500,000 in protected revenue.

94.5%

Correctly identified active loading states amidst dense industrial noise

Near Real-Time

Replaced 6-hour paper reporting lags with instant spatial tracking

$520K

Eliminated fleet idling penalties and optimised asset deployment

By replacing stale gate manifests with absolute spatial truth, the logistics firm gained total visibility over the refinery's loading efficiency in under 24 hours. The pipeline flagged that two of the refinery's main high-throughput loading racks were suffering from an unannounced 4-day mechanical shutdown. Armed with advance visibility, the team dynamically re-routed their fleet to secondary terminals and adjusted driver shift schedules before trucks ever left the depot — entirely eliminating idle standby times.

> *"We knew exactly which loading bays were open and when our trucks would be clear — before the refinery's own gate crews did. It turned a chaotic bottleneck into a highly predictable, profitable route."*
>
> — Operations Director