



TSI SOLUTIONS

SINGAPORE BORN
GLOBAL PRESENCE
PROVEN SOLUTIONS





TSI SOLUTIONS : INTELLIGENT, DATA DRIVEN SOLUTIONS

TSI Middle East Information Technology Solutions LLC offers a unique synergy of global innovation and sovereign-grade security, drawing on the collective expertise of our dedicated hubs in the **United Arab Emirates** and **Singapore**. With over 15 years of experience, TSI has established itself as a trusted partner for leading technology companies, government agencies, and commercial enterprises across the Asia-Pacific and the Middle East regions. Headquartered in Singapore, TSI has been instrumental in advancing smart city infrastructure and collaborative technology solutions.

By integrating these regional strengths, we provide a seamless bridge between cutting-edge AI research and the practical demands of urban infrastructure. At the core of our resource offering is a proven track record in developing and maintaining production-grade computer vision systems. Specifically, our team brings extensive experience in License Plate Recognition (LPR) deployments tailored for high-stakes transportation environments. We specialize in architecting resilient platforms capable of handling millions of daily transactions, ensuring that data accuracy and system uptime remain uncompromised even under massive transactional loads. This expertise ensures that the proposed solution is not only innovative but also hardened for the rigors of real-world, city-wide application

As a **CPX** company, TSI integrates world-class cybersecurity DNA directly into our development lifecycle. This organizational alignment allows us to leverage localized insights from two of the world's most advanced smart city ecosystems while ensuring every solution is anchored by the rigorous defense-in-depth standards and cybersecurity resilience for which **CPX** is recognized.



AI + BIG DATA = REVOLUTIONISING TRAFFIC MANAGEMENT, SAFETY, LAW ENFORCEMENT, AND MORE

TSI's expertise primary lies in the development and delivery of smart city solutions, with a special focus on seamlessly integrating physical hardware, AI-empowered software, and cutting-edge information and communication technology, including 4G/5G, to enhance the efficiency and safety of the country.



Intelligent transport and traffic management solutions powered by AI and Big Data for the ultimate in road safety is among our key specialties.



TSI's comprehensive smart and safe city solutions take advantage of the most recent technological advancements to meet the diverse needs of modern urban environments.



Our commitment is focused on providing tangible benefits, increasing efficiency, and ultimately contributing to a better quality of life.

CASE STUDY

SUCCESSFUL IMPLEMENTATION ACROSS 3 REGIONS



Our products have been successfully implemented in **Ethiopia, Singapore** and the **UAE**;

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In **Abu Dhabi, UAE**, we completed multiple ‘Smart and Safe’ transportation projects, with over 2,000 ANPR cameras installed along major highways and public roads. Adoption was robust despite the high temperatures and generally dusty environment.

Additionally, over 7000 taxi and buses were installed with our MDVR system (MOVIS) to protect not only the passengers but also the drivers.

Our border security and CCTV project in Ethiopia through the suite of public safety applications and software, greatly reduced instances of border rules violation and illegal immigration, while also keeping the general public safer from unwanted incidents.

In **Singapore**, we successfully implemented our Asset Tracking and Command and Control System (C2) through Vigilance, to keep company personnel and mobile assets safer, providing unmatched security and intel, and ultimately, ensuring complete safety and security of the mobile asset.

SYSTEM OVERVIEW

Our smart and safe city solutions have been successfully deployed to address a range of requirements:



INTELLIGENT TRAFFIC MANAGEMENT

Optimization of urban mobility by implementing intelligent Traffic Management Systems, helping to reduce congestion, improving traffic flow, and enhancing overall transportation efficiency



VEHICLE, BUILDING, AND CRITICAL INFRASTRUCTURE

Tracking and Protection: Tracking, protection, and surveillance of vehicles, buildings, and critical infrastructure, aiding in enhancing security measures and minimizing risks.



SECURED COMMUNICATIONS

Implementation of secure communication systems as a priority, ensuring that data and information exchange within the smart city ecosystem are protected from unauthorized access and breaches at all times.



LAW ENFORCEMENT & BORDER SECURITY

Our solutions support crime prevention, incident response, and public safety through integrated CCTV surveillance and automated checks — securing restricted areas and borders while maintaining fast, efficient movement of people and vehicles.

NAWAH (AI) CORE



NAWAH: The Intelligent Core for Smarter Cities and Seamless Command.

Inspired by the Arabic word meaning "نواة," NAWAH is TSI's advanced, AI-driven monitoring and analytics platform.

Built on a **cloud-native, Kubernetes**-based architecture, NAWAH unifies License Plate Recognition (LPR), CCTV surveillance, Big Data processing, and Large Language Model (LLM) capabilities into a **single, centralized command hub**

Artificial Intelligence

NAWAH's AI engine validates itself. Through AI Tabulation, the platform continuously compares camera results against AI analysis, automatically generating accuracy reports for detection and recognition rates. No manual verification. Every transaction validated.

Camera Health AI detects dirty, foggy, blurred, or misaligned lenses, triggering maintenance alerts before image quality degrades.

Value-added AI identifies traffic violations including illegal lane changes, emergency lane violations, seatbelt non-compliance, and mobile phone use while driving – transforming raw video into enforceable evidence.

License Plate Recognition (LPR)

End-to-end license plate detection, recognition, and confidence scoring across thousands of cameras. Supports GCC plates and custom formats. AI Tabulation automates performance validation – eliminating manual verification and generating accuracy reports.

Big Data Intelligence

NAWAH processes millions of daily vehicle transactions through layered analytics pipelines that turn raw events into actionable intelligence.

- Temporal analysis – Hourly, daily, and weekly traffic trends by lane, direction, and vehicle class
- Spatial analysis – Origin-destination mapping, route popularity, and congestion hotspots
- Predictive modeling – Short-term traffic forecasting for proactive traffic control
- Fraud detection – Real-time alerts for duplicate plates appearing at impossible locations within implausible time windows



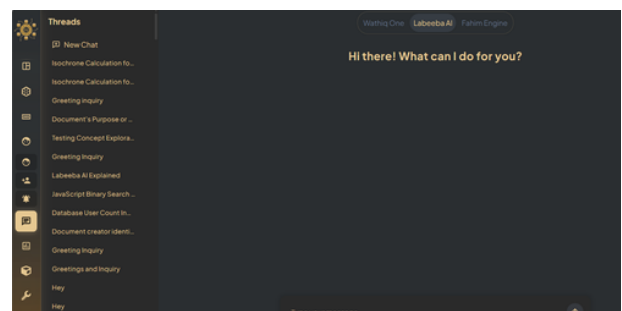
TASK NAME	CHANNELS	ALGORITHM	STATUS	SCHEDULE	FREQUENCY	ACTIONS
ICDLA-17208921883	TSI-04-Phank-L1	Regal Lane Change Detection	Completed	Mon 01, 2024 at 12:00 PM Tue 02, 2024 at 12:00 PM	Only	
PCD-1768959186337	TSI-04-Phank-L1	Crowd Density	Completed	Mon 01, 2024 at 12:00 PM Tue 02, 2024 at 12:00 PM	Daily	
ICDLA-1768959172784	TSI-04-Phank-L1	Regal Lane Change Detection	Completed	Mon 01, 2024 at 12:00 PM Tue 02, 2024 at 12:00 PM	Only	

Large Language Model (LLM) Assistant

Operators interact with data using plain English. Ask: **"*Show me watch-listed vehicles from the past 24 hours*"** – and get instant answers. AI-Assisted Root Cause Analysis automatically examines system logs when incidents occur, identifies causes, and recommends fixes – reducing downtime. Automated reporting delivers daily, weekly, and monthly performance summaries to stakeholders.

Face Recognition (FR) Engine

NAWAH ingests face capture images with full metadata and performs high-speed 1:1 and 1:N face matching. Supports watchlists and whitelists with full lifecycle management. Enables intelligent search using GPS, time, and attribute filters – publishing real-time events for security workflows.



HORNET (AI) DEVICE



HORNET: Rugged Edge AI Intelligence for Vehicles and Harsh Environments.

HORNET is TSI's in-house developed, compact AI edge device designed to bring real-time analytics to your existing fleet without replacing your current cameras. Powered by the NVIDIA® Jetson™ Orin NX 16 with up to 157 TOPS of AI performance, HORNET processes video at the edge, delivering instant insights with zero cloud dependency.

Built for buses, taxis, patrol cars, and critical infrastructure, HORNET is IP67 waterproof, dustproof, and shock-resistant, ensuring reliable operation from -40°C to +85°C.

HORNET Hybrid Camera Interface: Supports analog (TVI) and IP cameras simultaneously. Migrate from legacy systems to AI intelligence without replacing your existing camera infrastructure.

HORNET Real-Time AI Processing: Runs advanced computer vision models at the edge, driver behavior monitoring, passenger counting, incident detection, abandoned object detection, and LPR, all with under 50ms latency.



HORNET Flexible Connectivity: Supports 5G/LTE with dual SIM/esIM, GPS, WiFi, and dual 1G Ethernet (M12 X-Coded). Optional 4x GMSL2 for high-bandwidth camera input.

HORNET Intelligent Storage: Onboard M.2 NVME storage up to 4TB for continuous recording and edge data retention. Hardware encoding/decoding for H.264/H.265.

HORNET Central Platform Integration: Seamlessly connects to TSI's NAWAH platform for centralized monitoring, alert management, fleet analytics, and over-the-air updates.

HORNET Power Flexibility: Wide input range from 12V to 48V DC. Passive or active cooling options. Mounting options include wall mount and DIN-rail.

NUCLEON PLATFORM



NUCLEON: Empowering Public Safety, One Agency at a Time.

Revolutionize your command and control. NUCLEON is a suite of advanced applications designed to empower first responders and safeguard communities.

Built for Flexibility. We offer a wide range of pre-configured solutions that can be seamlessly customized to your agency's specific needs. No one-size-fits-all here.

Peace of Mind. Guaranteed. NUCLEON prioritizes reliability, ensuring smooth operation when every second counts. This translates to peace of mind for both first responders and the communities they serve.

Powering You with Progress. NUCLEON seamlessly integrates cutting-edge technology with TSI's years of expertise, creating a powerful platform for success.

Your Unique Needs, Our Tailored Solution. Our dedicated team translates your operational requirements into bespoke technical modules. NUCLEON perfectly aligns with your agency, optimizing operations and empowering your first responders.

Contact us today and let NUCLEON be the backbone of your public safety success

NUCLEON™ Map: Supports all open map and proprietary map standards with unique view options, route planning, and map distance & area measurement.

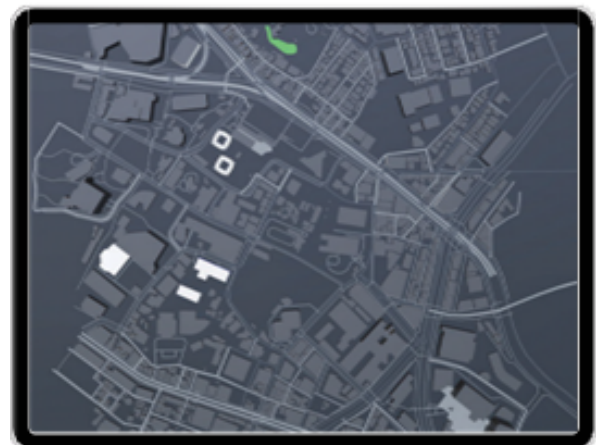
NUCLEON™ Reports: Detailed reports on target location, route, operations, and customised reports with additional details.

NUCLEON™ Secured Messaging: Effective and efficient communication of data via video and voice call, text messaging, and file sharing.

NUCLEON™ Playback: Detailed video feeds on single or multiple targets with audio and live location of targets. Playable on standard video playback software.

NUCLEON™ Alerts: Provides device status along with geo-fencing capabilities, motion detection and speeding/tampering alerts.

NUCLEON™ Admin: Multiple administrative functions including device and account type management, role privilege management and live updates for front-end devices.



MOVIS



Mobile Vehicle Video Surveillance (MOVIS) is an Intelligent Mobile Video Monitoring system vital to government agencies seeking to improve homeland surveillance infrastructure, so as to best protect their critical assets and ensure public security.

The MOVIS™ Security Suite offers a comprehensive intelligent systems to enable effective situational awareness.

Innovative features like enhanced mobile video monitoring capabilities and real-time data analysis enables the system to provide a state-of-the-art suite of C2 applications for complete Command and Control.

MOVIS™ Drive provides continuous high-def streaming via 4G/LTE networks; designed for maximum portability to support rapid deployment.



MOVIS™ Monitor offers enhanced tracking capabilities which ensure optimal surveillance of vital assets and key installations.

MOVIS™ SenseMake is backed by Intelligent data analysis to process real-time location, sensor and video data to achieve proactive command and control.

MOVIS™ Action facilitates effective communication for prompt response and dispatch during a national crisis.

MOVIS™ Maestro enables complete coordination of the forward command and field units with the command centre.

VANTAGE



VANTAGE™, our Intelligent Traffic Information System, is the perfect solution for enhanced public road safety and law enforcement.

The comprehensive VANTAGE™ Security Suite can identify unique vehicle number plates, generating critical traffic stats to help government agencies monitor, maintain, and manage traffic as well as road development.

VANTAGE™ Drive features a self-contained system with an integrated Automatic Number Plate Recognition (ANPR) system which can accurately capture vehicle number plates up to speeds of 250 km/h.

VANTAGE™ Control contains a host of automated systems to control traffic lights and monitor traffic violations for smoother flow and safer roads.

VANTAGE™ Track creates black/white lists to intelligently track the movement of suspicious vehicles

VANTAGE™ Connect enables VANTAGE™ devices and software to seamlessly connect with existing traffic surveillance equipment for control through a single app-based platform.

VANTAGE™ Real-Time enables traffic personnel to zoom in on critical sites and view detailed live data for real-time traffic monitoring.

VIGILANCE



VIGILANCE™ is a Portable Location and Tracking Intelligence system designed for public safety and mobile asset tracking, utilizing international GPRS/GSM networks to determine and report on any mobile asset's location with unparalleled accuracy.

The VIGILANCE™ Security Suite can be fully customized to meet the specific security needs for both personnel and vehicle tracking.

VIGILANCE™ Drive supports superior location tracking with a per second accuracy of up to 10m and offers optional data encryption.

VIGILANCE™ Secure enables front-end VIGILANCE™ devices to be integrated with multiple safety features such as vehicle immobilization, motionless alerts, SOS functionality, and more.

VIGILANCE™ GeoFence contains customizable tracking rules to ensure tracked assets remain within their assigned locations/designated routes.

VIGILANCE™ Maestro is an integrated C2 to enable coordination of forward command and field units with the command centre.

VIGILANCE™ SenseMake utilizes intelligent data analysis to process real-time location and sensor data to enable proactive command and control.



DIGITAL TWIN

Digital Twin offers an online live simulation of real-world traffic scenarios on a 1:1 basis.

Real-time vehicle trajectories at an intersection, for example, are converted into a simulation model, with the vehicles in the model representing the real-time vehicle information at the intersection.

2 core technologies help Digital Twin deliver its intended purpose:

- Comprehensive road network perception helps to realize high-precision perception of road travel information for all entities on the Digital Twin network, establishing a comprehensive perception network.
- Computational road network transforms the actual road network into a fully digital model using high-precision digital mapping methods. At the same time, detailed traffic rule information is annotated, including road signs, markings, lane attributes, etc. as per the requirements of the local traffic engineering body. In addition:

Digital Twin is a new way of Traffic Command and Control, utilizing technologies like video tracking and video recognition, GPS positioning, data inference and data fusion, allowing the user to monitor the entire journey along with events encountered by the tracked vehicle in real time. This helps to create the historical trajectory and events of associated with a tracked vehicle.

Holographic Road Network provides comprehensive information on pedestrians and vehicles, mapping from reality to virtual digits.

AI-based signal control offers a real-time responsive solution through decentralization, multi-agent collaboration and AI traffic control model, resulting in more proactive control for the facilitation of faster, smarter traffic signal control.

Panoramic views of traffic provide a “God’s eye view” of entire road networks in real time.



BIG DATA & ADVANCED ANALYTICS



Millions of daily transactions are processed through real-time and batch analytics to deliver actionable intelligence across any operational environment.

Temporal Analysis provides hourly, daily, and weekly trends by location, device, and event type – giving operators clear visibility into peak activity periods and behavioral patterns.

Spatial Analysis generates origin-destination matrices, movement popularity rankings, and congestion or incident hotspot mapping – enabling enterprise-wide operational optimization.

Predictive Modeling delivers short-term forecasting and event-impact prediction, allowing agencies to move from reactive monitoring to proactive decision-making.

Anomaly & Fraud Detection provides real-time alerts for duplicate identities, impossible travel logic, and suspicious behavioral patterns – identifying threats and irregularities instantly.

All insights are delivered through executive dashboards, operational reports, and scheduled exports in multiple formats.

APPLICATION SCENARIOS

Campus scene



Face + Perimeter + Behavior +
Bright Kitchen and Bright Stove

Airports/Stations



Face + People Counting +
Structuring

Office park



Face + Perimeter + Behavior

Production parks



Face + production safety
supervision + perimeter

Construction sites



Production safety supervision +
construction site

Living Community



Firefighting + high-altitude
throwing



WHY TSI? OUR COMPETITIVE EDGE

TSI primarily focuses on understanding its clients' needs in order to provide high-quality, and cost-effective solutions. We offer comprehensive support on all our products, exceeding client expectations in each case by delivering innovative and transparent solutions to fully address their needs. Using the latest technology, our knowledgeable backend team provides advanced and integrated functions, continuously striving for excellence and ensuring the best outcome for our clients. We utilize technology to solve real-world problems, making people's lives easier and improving the quality of their lives as well. We're fully dedicated to creating customized solutions which positively impact both businesses and communities.

www.tsi.tech



Certification

- ISO 9001:2015
- ISO 14001:2015
- ISO 45001:2018
- ISO 27001:2022

TSI Advantage

Our clients trust our ability to face the challenges associated with the markets in which we work in. Our strengths include:


- Solid reputation as a provider and partner that always fulfils its commitments.
- Provide the highest quality of human resources. Continuously strive for excellence and quality.
- Complete client focus from start to finish.
- Capable of technological transfer among different markets to aid clients across the globe in making the most of our unique products.



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