XDNA by Downer

Accelerating Your Extraordinary.

XDNA turns complexity into clarity, powering smarter decisions, stronger teams, and faster results where they matter most.

CAPABILITY STATEMENT | RAIL

XDNA by Downer

Our story. Our pedigree.

Downer's Rail and Transit Systems is recognised as the leading rail business in Australia, with expertise in delivering whole-of-life asset management support to customers.

With over 155 years of rail experience, the organisation delivers innovative transport solutions. Today, Downer leverages its capabilities to offer rollingstock, infrastructure, rail systems, operation and maintenance, system integration, engineering innovations and digital and data solutions.

Through its Rail and Transit business unit and dedicated digital and data capability – XDNA the business combines systems and industry expertise with emerging technologies, to solve real operational challenges and drive real outcomes for customers.

XDNA solutions enable predictive maintenance, real-time insights, and immersive training – driving measurable gains in efficiency and safety through to work operations management.

Current customer outcomes

Higher Train availability

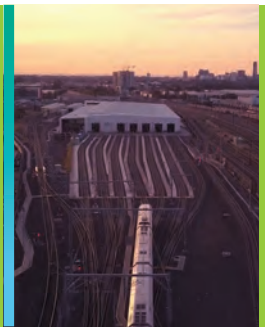
Extra capacity in the existing maintenance Facilities

Reduced Overtime

Operational benefits

- **Automatic detection** and notification of failure events
- **Shorten diagnosis** period and address alerts quickly
- **Faults are positively identified** & priority list for investigation and CCTV review
- **Real-time monitoring** of safety critical failure mode allows trains to remain in service longer.
- Real-time monitoring data is used to **prioritise preventative maintenance** activities across the fleet
- Machine Learning, data analytics and Robot Process Automation is used to **eliminate false positive** alerts

Improved Life Cycle Cost over the life of the asset



LCC benefits

- **Reduced in-service** failures and associated penalties
- **Reduction of abatement** / KPI cost linked to reduced train availability
- Enables **optimised planning** and prioritise scheduled maintenance instead of expensive corrective maintenance
- Condition Based Maintenance allows **maintenance and overhaul interval extensions**

Improved safety assurance for safety critical systems

Safety + sustainability benefits

- Improved control and **condition monitoring of safety critical items**
- **Ensure accuracy and quality** of the technical maintenance data and the business data
- **Better** control of **safety critical system performance**

Let us introduce ourselves

Welcome note from XDNA

Click the video here ▸

XDNA is Downer's digital innovation business, delivering next-generation solutions for critical industries. Backed by 155 years of experience, XDNA combines deep industry knowledge, advanced technologies like AI, AR, Digital Twins and Robotics, and a set of platforms and methods to deliver accelerated, integrated, adopted, and secured solutions to real world opportunities.

Delivering proven results

Our track record is delivering effective solutions that achieve proven results in the real-world.

Living in industry

We live and work in the same industries as our customers, giving us the edge in designing solutions relevant to industry needs, considerate of operational adoption, integrated into critical processes, and secure by design.

Driven by speed to value

We specialise in turning emerging technology into fast, scalable value. We bridge innovation with execution practices to deliver impactful solutions at speed. We work in weeks not years.

Our offerings

Asset Management

A core capability focussed on the productivity and efficiency of physical assets and related work through their operational lifecycle.

We improve asset performance and reliability at every stage using data-driven tools for asset management, maintenance, and work execution – maximising productivity and minimising downtime.

- **Maintenance Management**

21%
increase in utilisation

Operational Intelligence

We empower better decisions with rich, contextual data insights.

Through advanced instrumentation, data engineering, and IoT integration, we help you organise operations across assets, processes, and entire value chains.

- Neuroverse
- TrainDNA

100,000
plus, alerts daily

Industrial AI

We deliver AI-powered solutions that tackle complex challenges, streamline inefficient processes, and drive innovation.

Our industrialised data science approaches are designed to unlock transformational value and practical breakthroughs for your business.

- TrainBrain
- Industrial AI-as-a-Service

50%
improvement in time efficiency

Future Work Solutions

We future-proof your workforce by integrating automation and robotics into daily operations.

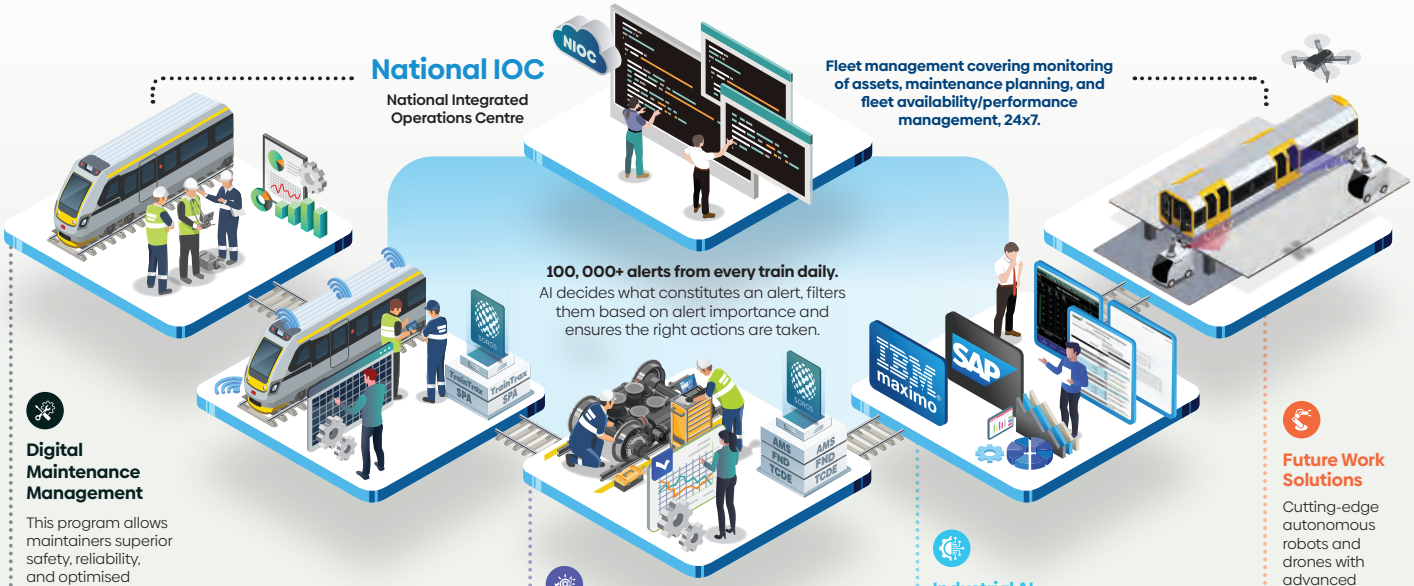
From training to optimisation, we focus on enhancing productivity and quality through augmented and automated work experiences.

- Robotics & Automation
- Augmented Worker

25%
increase in overall productivity for facility, field & SME technicians

Delivering next gen technology solutions beyond what you thought possible.

Step change in rail maintenance



Digital Maintenance Management

This program allows maintainers superior safety, reliability, and optimised effort across every step of their fleet's maintenance programme, through design and continuous improvement.

The smarts to innovate and automate maintenance management practices. Accelerates the move to digitisation, keeping pace with complex, growing and changing travel demands.

Operational Intelligence

The eyes and ears on the track –the train sends real-time messages and location data, allowing the operations center to promptly identify alerts, implement onsite fixes, or facilitate maintenance.

Industrial AI

Data from trains, subsystems, maintenance records, track-side equipment, and condition-based inspections is stored and used for analysis, trending, and predictive models, leading to data-driven maintenance optimisation.

Future Work Solutions

Cutting-edge autonomous robots and drones with advanced sensor technologies to support repeatable and highly accurate inspections.

Capability

XDNA exists to solve the toughest operational challenges faced by critical infrastructure industries. We're not just a technology provider. We're a force multiplier, delivering the tools and intelligence the workforce needs to make faster, safer, smarter operations and decisions.

- Provided a **51%** improvement in fleet reliability
- Enhanced efficiency in maintenance delivery allowing for a **21%** growth in fleet, with minimal increase in workforce requirements
- Enabled a **2 fold** extension in the routine periodic maintenance interval

Our rail accreditations

- **ISO9001:2015 (Quality)**
- **ISO14001:2015 (Environment)**
- **ISO/IEC 27001:2013 (Information Security Management System)**
- **ISO45001:2018 (Safety)**
- **IRAP Assessed Secure Solutions supported by Australian security-cleared personnel**
- **2024 AMPEAK Asset Management Innovation award WINNER**

ASSET MANAGEMENT COUNCIL

Existing capabilities

- TrainTrax
- Fleet Network Display
- Set Planning & Analysis
- Alert Management System
- Train Crew Emulator Display
- Data Science & Analytics
- Wayside Data Ingestion
- Maximo Integration & Data Management
- Augmented Reality
- Virtual Reality
- Train Underframe Examination System (TRES)
- Rail Facility Drone (RFD)
- Secure Hosting - DASH

TrainTrax

TrainTrax is a user-friendly depot management and analytics tool that shows where every train is and what's happening in the depot. With clear views and powerful analytics, it helps identify bottlenecks, improve coordination, and cut maintenance costs.

Fleet Network Display

A centralised and visually data-rich application, Fleet Network Display provides a bird's-eye view of every fleet across the network. This comprehensive overview helps to track the movement of the fleet with real-time information on the asset performance, location and status.

Set Planning & Analysis

Set Planning and Analysis provides comprehensive forward planning for all maintenance activities, enabling operators to stay ahead of network demands and respond with confidence.

Alert Management System

The Alert Management System is an advanced event correlation capability that processes thousands of data points from every train and tram each minute. It analyses incoming messages, detects potential issues, prioritises them, and raises alerts to ensure timely action.

Train Crew Display Emulator

Providing a replicate view of a real-time train environment, from a fleet-wide perspective to a single train, Train Crew Display Emulator enables more visibility of the train cab than seen by the train crew.

Data Science & Analytics

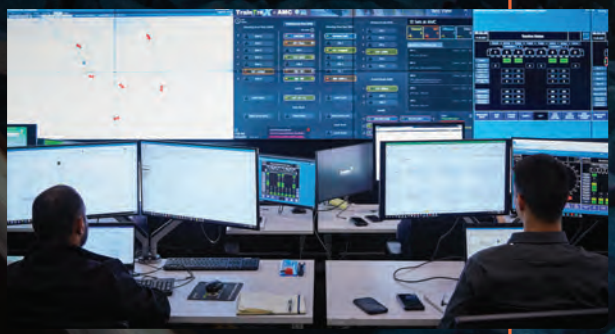
Our Data science and analytics takes a simplified approach to managing the vast amounts of data, systems and applications used in train operations and maintenance. We analyse your current state data, applications, and system integration landscape, introduce capabilities immediately and develop a roadmap for your applications, systems, and data architecture to bring on additional capabilities over time.

Wayside Data Ingestion

XDNA's team of engineers and data scientists apply sophisticated algorithms, leveraging machine learning and statistical modelling, to uncover deep insights into asset behaviour and performance. Wayside data refers to the information collected from Downer's own, or their customer's sensors and monitoring systems positioned along rail infrastructure or similar assets.

It can include environmental conditions, asset performance metrics or event-based triggers captured in real time. The insights include predictive failure analysis, optimisation of asset utilisation lifecycle, in-service failure prevention and automation of monitoring and reporting.

The result is enhanced maintenance strategies, reduced downtime and savings in labour hours, ultimately improving reliability, safety and customer satisfaction.



Existing capabilities

Maximo Integration

Maximo is at the core of how XDNA manage operational maintenance and through-life support of rolling stock. XDNA solutions integrate with Maximo data with advanced analytics to detect duplicate work orders, optimise procurement processes, and provide critical inputs for corrective maintenance analysis.

Secure Hosting - DASH

Designed and built by xDNA, DASH is a secure, Australian-hosted, multi-tenant cloud platform engineered to support government-grade applications in high-assurance environments. It provides a fast, cost-effective way to launch, operate, and scale digital solutions, with the right controls in place from day one.

Hosted on Microsoft Azure infrastructure with all services in Australia, DASH enables multiple organisations to securely share infrastructure and services while keeping their environments and data isolated. This delivers powerful economies of scale without sacrificing performance, security, or control.

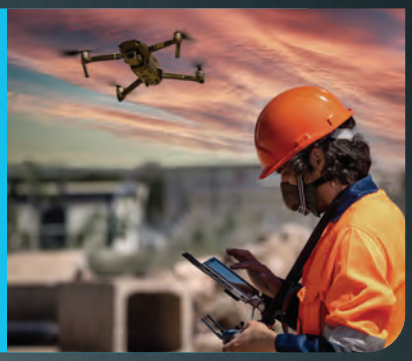
Augmented Reality / Virtual Reality

XDNA uses Augmented Reality (AR) and Virtual Reality (VR) modules to enhance workforce training, safety, and operational readiness. Modules simulate fault scenarios and maintenance procedures, reducing onboarding time and improving technician confidence.

Rail Facility Drones

Watch video

The Rail Facility Drone (RFD) is an autonomous UAV that inspects sheds, overhead wires, and fences. It uses infrared and optical sensors to create digital twins of assets and identify defects. The drone operates via a docking station equipped with a weather monitoring system and can fly for up to 45 minutes with a range of 9–15 km.



Underframe Train Examination System

The Train Examination System (TRES) is an autonomous inspection robot for rollingstock assets. It is equipped with sensor kits using the latest LiDAR, Laser, and Optical technology to identify rollingstock component condition and defects.

TRES is a fully autonomous system that provides the unique capability to perform inspections without any required civil work or modification to existing Maintenance Facilities. TRES is typically able to automate up to 70% of underframe inspections.

Watch video

Capability through innovation

Industrial AI

XDNA Industrial AI is our data science and AI capability, built on scalable platforms and deep engineering heritage, that tackles the toughest challenges across asset management and supply chain lifecycles to deliver smarter, more efficient solutions to critical infrastructure customers.

Virtual Management Consoles

Virtual Management Consoles look to unify data from disparate systems to deliver real-time, actionable insights helping executives, operators, and maintainers of critical networks and assets make faster, better decisions before opportunities are lost or issues escalate.

Catalyst

Onboard always-available AI agents now located within an organisation. These agents augment technical and engineering workforces by understanding business assets and processes, enabling rapid productivity improvements where they matter most.

Workflow Automation

The ability to use workflow automation to align to planned maintenance activities with digital sign-off sheets, enabling accurate tracking and analysis of in-field performance. This approach helps identify critical dependencies, generate actionable insights, and drive continuous improvement initiatives.

Autonomous Cleaning Robots

Dower RTS in conjunction with Deakin University, have developed the world's first fully autonomous cleaning robots for passenger rail.

There are two robots, one focused on the floors, designed to scrub, mop and vacuum all at once, cutting down cleaning time and boosting efficiency. While the other focuses on surface cleaning of seats and passenger windows, using steam technology, it ensures hygiene and comfort for passengers.

Both robots work in tandem with cleaning staff to make maintenance more efficient and effective, as well as develop future-ready skills.

Neuroverse Cognition

Advanced AI and cognitive computing capability provides human-like reasoning to uncover patterns, generate insights, and enable faster, smarter decisions across complex operational and business environments.

TrainBrain

TrainBrain provides instant access to the latent knowledge hidden in unstructured data. It enables any question to be asked about assets, processes, and procedures, then finds, summarises, and presents clear solutions. It is used for requirements validation in complex projects, staff onboarding, and more.

Beyond just data: driving actionable insights.

Bearing & brake failure prediction

XDNA has developed algorithms that leverage Wayside Monitoring Data – specifically the Bearing and Brake Temperature System (BBT), RailBAM, and WILD data – to identify overheating and at-risk bearings weeks before failure. These models are proven on A and B-sets and can be readily extended across the wider trains fleet.

Pantograph wear & damage prediction

Using Wayside Monitoring Data, XDNA has built algorithms to monitor pantograph wear rates on A-Sets and B-Sets and forecast required maintenance. In parallel, on HCMTs, Downer are eliminating the need for physical inspections by successfully detecting defective pantographs ahead of failure. These approaches are also directly transferable across other train fleets.

Sun exposure false positive detection

XDNA has designed an algorithm to identify false positive sun-exposure readings within the Bearing and Brake Temperature System. Currently in proposal stage, this would enable Sydney Trains to automatically filter out false hot-bearing alerts – removing the need for costly shading gantries while improving operational reliability.

AI in Rail: Not removing. Improving.

GENERATIVE AI SOLUTIONS

PCR classification

XDNA has developed algorithms that leverage Wayside Monitoring Data – specifically the Bearing and Brake Temperature System (BBT), RailBAM, and WILD data – to identify overheating and at-risk bearings weeks before failure. These models are proven on A and B-sets and can be readily extended across the wider Sydney Trains fleet.

Procurement optimisation

Using language models, XDNA can classify tens of thousands of components, uncover inefficiencies in the supply chain, and identify items that fail repeatedly, which is the cause of significant hidden costs.

Computer vision for depot operations

Machine learning and vision models have been developed to automatically identify trains in depots down to the nearest road, replacing manual sighting processes.

Generative AI products

TrainBrain and Copilot solutions embed generative AI directly into engineering and maintenance workflows. TrainBrain is an AI assistant that ingests Downer's engineering and maintenance documentation and provides quick, accurate responses to technical queries, democratising access to expert knowledge, accelerating and improving decision-making, and up-skilling staff by making complex information readily available.

TrainBrain ensures that engineering knowledge is faster to access, easier to apply, and more consistently used across the organisation, driving significant gains in productivity, safety, and operational efficiency.

NEUROVERSE

Neuro-AI using train data

Neuroverse is XDNA's AI-powered analytics engine, built to transform complex rail data into clear, actionable insights. In practice, it has enabled operators to predict subsystem failures such as HVAC and auxiliary power issues before they occurred. By combining real-time telemetry with historical data, Neuroverse has identified HVAC faults days in advance and flagged early signs of thermal issues in energy storage systems. These insights support proactive maintenance, reduce risk, and boost fleet performance. From engineers to executives, users can easily visualise data, drill into specific issues, and make smarter decisions with confidence.

Allowing users – from engineers to executives – to visualise data, drill into specific issues, and make informed decisions quickly. It integrates spatial data, weather inputs, and external datasets to provide a unified operational view. NeuroAI, a component of the platform, supports natural language queries and machine learning model deployment, making advanced analytics accessible to non-technical users.

Our Team

Connected by Performance & Digital Passion

At the heart of our business is a dedicated team whose collective skills and capabilities drive real value for our clients. Each staff member brings a unique blend of expertise, creativity, and commitment, ensuring excellence across every project. United by a shared passion for digital innovation and a relentless pursuit of performance, our people collaborate seamlessly to deliver outstanding results.

Together, we form more than just a workforce – we are a connected team committed to elevating your business through talent, dedication, and a future-focused mindset.

Skills

- Data Science & Machine Learning
- Data Engineering
- BI Analytics
- UX & Human Centric Design
- Business & Technical Analysis
- Software & Cloud Engineering
- Architecture & Security Management
- Automation & Integration Engineering
- Service Management
- Project Management
- Change Management
- Operations Management
- Asset Management

Our customers

XDNA is committed to working with the best in the industry to deliver exceptional outcomes and a high-quality service in partnership with our customers.

We are lucky to have worked with some of the best across Rail and Transport, Critical Infrastructure, and Defence and Intelligence and look forward to continuing to partner with those looking unlock opportunities with next generation technology and new ways of working.

OUR VALUED CUSTOMERS

Downer
Australian Space Agency
NSW Government Transport for NSW
ENSIGN
Army
LIFE WITHOUT BARRIERS
AngloAmerican
Dubaimetro
Transport Sydney Trains
OTRACO
Australian Government Digital Transformation Agency
NAVY
RET AARDIG ONDERWEG
Mineral Technologies A Downer Company
AE SMITH
SPOTLESS
KiwiRail
CDM COMMUNICATIONS DESIGN & MANAGEMENT

OUR KEY PARTNERS

Microsoft
IBM
databricks
danburykline
TAQTILE
FMT
DEAKIN UNIVERSITY
RDRIVE
STRIDES
altoura

XDNA by Downer

We'd love to chat and help.

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