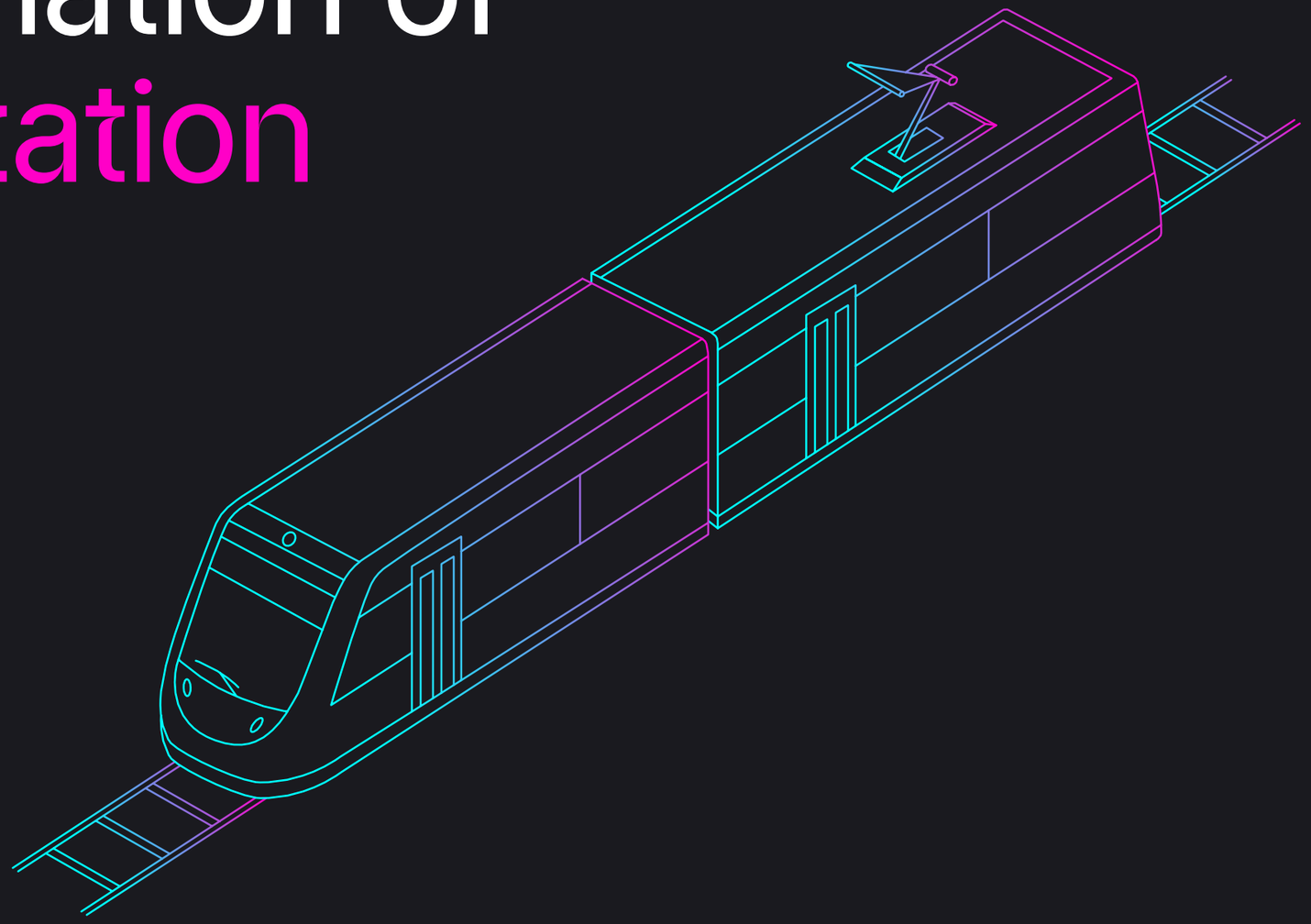
OCTAVE

EBOOK

The digital transformation of transportation



Introduction

From AI to ZEVs, the transportation industry is set to enter a decade of structural transformation.

Across the globe, the sector is a key component of efforts to reduce emissions and strengthen economic competitiveness, yet several important challenges remain. High-carbon transport modes must become significantly greener through electrification and alternative fuels. Large-scale infrastructure such as high-speed rail will require sustained investment and long-term planning, which is critical to reverse a pattern of major projects running over budget and schedule. Data will also play a central role in supporting multi-modal mobility and more integrated transport networks.

Many of these challenges will require the modernization of existing digital technologies and investments in areas such as AI, geospatial intelligence, predictive maintenance and asset performance management. These technologies are converging to enable more adaptive and connected transportation systems.

This e-book aims to provide transportation professionals with a broad overview of the trends that will have a far-reaching impact by 2030. It provides key figures, notions and expert opinions to help you navigate the digital transformation wave sweeping the transportation sector.

6 central trends

Disruption, digitization, decarbonization: Despite the diversity of situations, transportation operators will face some common trends and imperatives. Here are **six that will have a significant impact** across transportation modes.

Keyword: TEN-T

Part of the EU's Green Deal, the "sustainable and resilient" Trans-European Transport Network (TEN-T) aims to connect 424 major European cities via high-speed trains. Among the requirements, the deployment of the European rail traffic management system (ERTMS) and the ability to sustain minimum speed of 160km/hour. The project's "core network," representing more than 30,000 kilometers, must be completed by 2030, and its comprehensive network by 2050.

"Increasing safety can require thinking outside of the box. We can get data from road or rail vibrations, weather conditions, but also what vegetation is found nearby and what the deformation of the ground is. Operators should explore more how combining these multiple data sources can help predict safety issues."

Paolo Amodeo
Manager Pre-sales, Octave Attune EAM *(formerly HxGN EAM)*

Trend 1:
The ZEV revolution

27

Countries, including 15 in the EMIA region, have committed to the aim of 100% zero-emission new medium- and heavy-duty vehicles sales by 2040s.

Source

30M

The EU aims to have at least 30 million zero-emission vehicles inoperation on European roads by 2030.

Source

Can regulations usher a revolution?

The maturity of zero-emission vehicles and the availability of charging infrastructure differ markedly across transport modes and geographies. But one of the clearest trends of the next few years is the large-scale shift to electric vehicles (EVs) both for passenger and freight.

In Western Europe, after decades of policies aiming to increase demand, the time has come to act on supply: multiple countries are now committed to phasing out petrol cars, lorries and buses in favor of electric and hybrid alternatives. The move has met with political and industrial resistance, which could lead to delays and exemptions.

Trend 2:
The infrastructure imperative

€791B

OECD countries currently spend €791 billion a year on transport infrastructure maintenance and investment.

Source

550,000

Public charging points are operational within the EU at the end of Q2 2023. McKinsey estimates this number will need to rise to 3.4 million by 2030.

Source 1, Source 2

Powering this revolution will require massive investments in infrastructure, in the form of charging stations, new energy sources or hydrogen production and transportation facilities.

But the infrastructure imperative goes far beyond new equipment. Catastrophes such as the Interstate 95 and Genoa bridge collapses have called into question the state of transportation infrastructure, which mobilizes as much as 2% of GDP in the EU.

Trend 3:
Jam today, jam tomorrow

+25%

The expected growth of freight transport in the EU by 2030. Fifty percent will be by road.

Source

€100B

The annual financial cost caused by traffic congestion in the EU – that's 1% of the EU's GDP – according to the UN.

Source

Despite efforts to reduce car dependency, private vehicles still account for the majority of commutes worldwide, including more than two-thirds in cities such as Rome and Manchester. In London, drivers spend an average of 156 hours a year – or 2% of their time – in rush-hour traffic.

Congestion is not limited to roads. Major airports are handling record passenger volumes, while shipping routes continue to face disruptions that create significant ripple effects across supply chains.

Trend 4:
The rise of rail

+50%

The EU intends to increase rail freight by 50% of current levels by 2030 and 100% by 2050.

Source

"In Europe, a rail Renaissance is underway" recently noted the New York Times.

On paper, rail is the perfect solution to EMIA's congestion issues: it is a popular, safe and environmentally friendly means of transportation. However, significant investments will be needed to achieve current objectives, such as the EU's plan to double high-speed rail traffic, renovate existing routes and alleviate bottlenecks.

Trend 5:
Mobility goes neutral

500 km

Scheduled collective travel of under 500 km should be carbon neutral within the EU by 2030.

Source

In the past few years, commitments to make governments, municipalities or companies either carbon-neutral or net zero have flourished.

These terms differ: carbon-neutral typically encompasses only CO2 while net-zero refers to all greenhouse gases. In addition, net-zero comes with three possible scopes to only consider its direct emissions (scope 1), or include emissions that occur to produce the energy it purchases and consumes (scope 2) or all other indirect emissions occurring in its value chain (scope 3).

Trend 6:
AI and SaaS feed a technology boom

61

Of IT leaders say they have moved business applications to the cloud in an effort to reduce costs.

Source

While the transformative potential of autonomous vehicles and generative AI often dominates media narratives, AI's most vital roles in transportation are essentially backstage, in the form of predictive maintenance, workforce optimization or smart fleet management.

Advances in AI and data analytics enable real-time tracking of vehicles, predictive diagnostics and streamlined maintenance schedules, significantly enhancing reliability, safety and efficiency while reducing operational costs. It can also optimize energy consumption and recommend transportation modes, schedules or diving patterns for greater sustainability. Cloud computing amplifies these advances, facilitating mobile maintenance and remote operations.

*"The integrated platform in the Octave multi-tenant cloud has enabled us to **digitally transform** the way we manage our tanker fleet and represents a major shift for fleet management onboard and ashore. It will support and improve collaboration and work processes and provides a solid foundation for future engagements with audit, inspection and vetting organizations."*

Robert Øksnes
Manager of Planned Maintenance Systems
Odfjell

7 ways Octave Attune EAM (formerly HxGN EAM) can benefit your asset management

01

Immediate insights, from anywhere

Leverage IoT and mobile devices for real-time asset monitoring, delivering a comprehensive 360° asset view and immediate contextual insights for swift action

02

Intelligence

Utilize data analytics and machine learning for predictive maintenance, transforming raw data into intelligent decisions

03

Cost-effective sustainability

Optimize vehicles, equipment and assets to enhance sustainability and lower costs simultaneously, striking a balance between eco-consciousness and fiscal prudence

04

Compliance made simple

Streamlined tools and systems simplify adherence to regulatory requirements, for instance, the ECM compliance for the railway industry

05

Full lifecycle management

Get a comprehensive view and accurate modeling of asset performance across its lifecycle, seamlessly integrating repair or replacement decisions for optimal asset investment

06

Enhanced decision-making

Make more informed decisions with GIS, BIM and OpenCAD, incorporating several layers of data and spatial information for comprehensive asset understanding

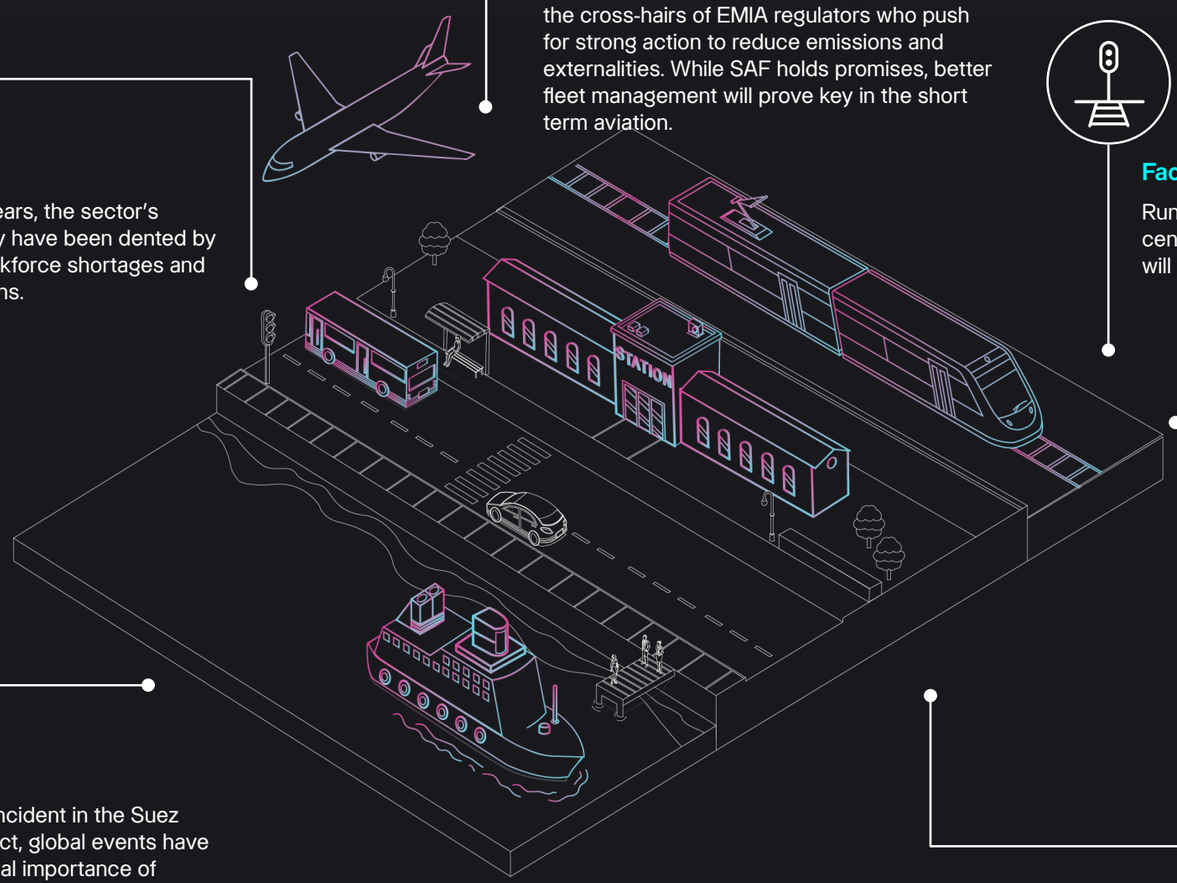
07

Continuous improvement

Enhance operations and gain greater visibility across the organization

Explore **Attune EAM**

Sector highlights



Aviation and ground handling / Page 11

The aviation and ground handling sector is in the cross-hairs of EMIA regulators who push for strong action to reduce emissions and externalities. While SAF holds promises, better fleet management will prove key in the short term aviation.

Road freight

Over the past three years, the sector's growth and profitability have been dented by volatile fuel costs, workforce shortages and supply chain disruptions.

Facilities and infrastructure / Page 12

Running 21st-century technology on 20th-century (or even 19th-century) infrastructure will be a defining challenge of the next decade.

Rail / Page 13

Can rail live up to expectations? The least emission-intensive mode of transport, it is expected to grow rapidly in most EMIA geographies, including the EU and India, with potentially transformative impact.

Maritime / Page 10

From the Ever Given incident in the Suez Canal to the Iran conflict, global events have underscored the critical importance of maritime shipping.

Buses / Page 14

Electrification, telematics and sustainable asset lifecycle management are shaping the future of urban and long-distance travel. But the sector has many hurdles to overcome.

Buses

Electrification, telematics and sustainable asset lifecycle management are shaping the future of urban and long-distance travel.

The sector, however, must overcome hurdles related to skills shortages, funding, infrastructure development and the adoption of new technologies.

Key challenges

- Widespread adoption of electric and hydrogen buses
- Rise in vehicle off road (VOR) time since the pandemic, particularly in organizations with undigitized asset management and maintenance processes
- New infrastructure and asset types at depots (e.g., EV chargers)
- On-demand and flexible routing
- Smart ticketing and payments

Key figure

Bus and coach operating companies in Europe face severe difficulties in filling driver positions.

Companies can adopt multiple strategies to go beyond competitive salaries: increasing retention, for example, by institutionalizing feedback or improving the quality of breaks; using technology to accelerate onboarding and training of new hires and optimizing shifts and routes, sometimes with the help of AI, to provide the same level of services with fewer resources.*

80%

*Source

Case study

transN uses Octave Attune EAM to streamline public transport maintenance and data management

transN, the public transport operator for the canton of Neuchâtel in Switzerland, plays a central role in the region's multimodal mobility system.With nearly 600 employees across 150 professions, transN operates both rail and road services. Its network carries 28.4 million passengers annually across 293 kilometers, served by 105 buses, 41 trolleybuses, 18 trains and 5 funiculars.

"Octave's solution plays an important role in our organization because it allows us to optimize production costs and gain a comprehensive view of our maintenance data. With better data management, decision-making became more efficient and effective, helping us stay competitive and meet the expectations of our sponsors and customers."

Yves Tabasso,
Technical and Infrastructure Director in transN

Read case study →

Maritime

The pandemic has proven how vital a role the maritime shipping industry plays in global trade.

The key challenge now is to navigate the complexities of integrating cutting-edge technologies while ensuring the safety and reliability of operations. The advent of autonomous vessels and IoT-driven preventive maintenance heralds a new era in fleet management.

Can it help the industry reach its objective of full decarbonization by 2050?

Key challenges

- Decarbonization and alternative fuels
- Automation, predictive maintenance and fleet optimization
- Emphasis on multi-modal transport
- Risk management against climate change and external disruptions

Key figure

Two-thirds of the growth in maritime freight capabilities in the next two years will come from very large ships (larger than 15,000 teu). On average, the largest ships are 60% larger than they were 10 years ago.*

65%

*Source

Case study

Odfjell secures reputation as a leader in safety and sustainability

Learn how Odfjell, a global leader in seaborne transportation and chemical storage, became a front-runner in security and sustainability by transforming the management of its tanker fleet with Attune EAM (HxGN EAM).

"The integrated platform in the Octave multi-tenant cloud has enabled us to digitally transform the way we manage our tanker fleet and represents a major shift for fleet management onboard and ashore, and will support and improve collaboration and work processes at Odfjel."

Robert Øksnes
Manager of Planned Maintenance Systems
Odfjell

Read case study →

Aviation, airports and ground handling

Once built, airports are becoming harder to operate. More passengers and flights place greater strain on baggage systems, boarding bridges, airfield lighting, HVAC, escalators, elevators and ground-handling teams. Every asset failure, along with every software failure, carries a higher operational cost because there is less slack in the system.

To meet the moment, airports need better coordination between operations, maintenance, contractors and asset management, so they can use existing capacity more efficiently, reduce disruption and extend the life of critical infrastructure.

Key challenges

- Pressure to trend toward Net-Zero
- Alternative fuels
- Use of AI for predictive maintenance, flight optimization and customer service
- Restrictions on airport expansions and short-haul flights

Key figure

The European Commission has set a target for Sustainable Alternative Fuels (SAFs) to represent 85% of aviation fuel by 2050 within the EU. Currently, SAFs account for less than 0.01% of the fuel used in aviation.*

85%

*Source

Case study

AES delivers superior airport services and boosts equipment availability with Octave Attune EAM

Airlines seldom handle the acquisition and maintenance of these vehicles and equipment themselves. Instead, they rely on specialized providers such as Alvest Equipment Services (AES). AES is active in hundreds of airports across Europe, Asia and North America, and is the top player in the United States and Saudi Arabia. This success owes much to its high-quality services, robust processes and dedicated software platform, Attune EAM.

"Maintenance technicians use Attune EAM mobile on their tablets, and everyone, from the back office, sales administration and accounting to the top management, is on Attune EAM. It's really the nerve center of our operations. We manage our own fleet there, our clients' fleets, all preventive and corrective maintenance, scheduling, all local and central spare parts stocks, supplier orders, cost management and recording of labor and subcontracting costs. Everything is done in Attune EAM."

Fabrice Denninger,
CEO of AES

Read case study →

Facilities and infrastructure

Running 21st-century technology on 20th-century (or even 19th-century) infrastructure will be a defining challenge of the next decade.

While several countries have a reckoning with the state of their rail and roads, transport infrastructure and facilities are undergoing a digital revolution. Asset management software, IoT for real-time monitoring and predictive analytics are becoming indispensable tools.

Key challenges

- Smart Infrastructure and real-time monitoring
- Climate resilience and asset interdependence
- Intermodal transport hubs
- Accessibility

Key figure

China spends 5.5% of its GDP on transport infrastructure whether for investment or maintenance. OECD countries average 1%.*

5.5%

*Source

Case study

Universita Cattolica del Sacro Cuore transforms facility management and operations with Attune EAM

Learn how Attune EAM helped to digitize more than 42,000 annual maintenance interventions, ensuring more efficient execution.

"For us, it was crucial to have a scalable and flexible asset management system that could optimize maintenance and operations while helping to preserve our architectural heritage. With Attune EAM, we have found a highly customizable solution provided by an international market leader that could meet our needs across a vast range of uses and evolve signifcantly over time, supported by a comprehensive portfolio of solutions and integrations."

Stefano Vincini
Head of Service for Maintenance and Development of Applications

Read case study →

Rail and rolling stock

Can rail live up to expectations? The least emission-intensive mode of transport, it is expected to grow rapidly in most EMIA countries.

India, in particular, is investing in the road-to-rail shift and is rapidly moving toward its target of 100% rail track electrification by 2024. The EU has also set significant objectives to expand high-speed rail transport and rail freight traffic. However, the sector faces the dual challenges of upgrading aging infrastructure and integrating smart technologies, all while adhering to stringent safety and regulatory standards.

Key challenges

- Support ECM 2019/779 regulatory compliance requirements
- Expansion of high-speed rail and rail freight
- Multimodal connectivity
- Hybrid and battery-powered trains
- Enhanced passenger experience and safety
- Improved digital tracking of regulatory compliance requirements

Key figure

The EU's Sustainable and Smart Mobility Strategy aims to double rail freight traffic by 2050.[1]

While rail freight traffic will double by 2050 as per the EU's Green Deal targets operators have proposed adding 32,000 km of high-speed railways to achieve these goals.[2]

x3

Case study

Stadler Rail Group optimizes maintenance operations with Attune EAM

Learn how Stadler Rail, a Swiss manufacturer of railway rolling stock, uses Attune EAM to map a new train fleet, including the definition of maintenance activities, in a single system in a very short time.

"There was an extensive selection process – but Octave's solution was ultimately the one with the most potential. Decisive factors in favor of Octave included the system's web capability, a high level of adaptability, flexibility and its ease of use."

Jonas Gerspacher
Project Manager
Stadler Rail Maintenance Software SRMS

Read case study →

1) Source, 2) Source

Logistics

Logistics has always run on thin margins: sector EBIT averages around 3–5%, offset by high volumes. In recent years, this financial equation has become more fragile. Fuel, labor and compliance costs are rising, while competitive pressure prevents proportional price increases.

Providers are responding to these pressures by digitizing their operations and investing in AI. In some segments, AI is becoming a baseline expectation. For example, in a recent NTT DATA survey, 74% of shippers said they would switch third-party logistics providers based on AI capabilities.

Key challenges

- Fragmented systems and data silos
- Margin pressure and volatile demand
- Scaling digital and AI beyond pilots
- High sensitivity to labor and energy costs, along with skill shortages

Key figure

Organizations that redesign work itself, rather than just introduce new tools, are twice as likely to exceed their revenue goals (Gartner).

2x

*Source

Case study

FM Logistic: the power of a blank-page approach to maintenance modernization

FM Logistic's ambition is to accelerate the shift to sustainable, omnichannel supply chains. Founded in 1967, this family-owned company is one of the leading international logistics players, with annual revenue of €1.7 billion.

Before adopting Attune EAM, the company needed to modernize fragmented, paper-based maintenance management across its large sites. After finding standard CMMS solutions too limited, FM Logistic selected Octave Attune EAM, with partner GC Team, because it covered its approximately 100 functional requirements with minimal customization. The result is a fully digitized, mobile-enabled maintenance operation that gives the company a global view of assets and stronger process rigor in line with its Powering 2030 strategy.

"This was possible thanks to strong engagement from FM Logistic teams, whether on site, in maintenance or at headquarters. I especially appreciated the close, transparent collaboration between FM Logistic, GC Team and Octave, forming one united team around a common goal,"

Frédéric Marcelle
Projects Director for Maintenance France
FM Logistic

Read case study →

Value engineering: Let us assess how to best bring value to your organization

In 2026, enterprise asset management (EAM) stands as a critical pillar for transportation organizations aspiring to bolster their bottom line and ensure safe and compliant operations.

The ability to drive maintenance efficiency, extend the useful lives of assets and minimize risks is paramount. Confident decision-making around repair versus replacement is facilitated by aligning MRO parts availability, asset performance management and data-driven autonomous operations.

Proven benefits

Customers have seen these improvements with Attune EAM:

- Up to a 50% reduction in maintenance overtime, labor and contractor costs
- 20% reduction in production downtime
- 30% reduction in inventory levels
- 10% reduction in materials costs
- 50% reduction in purchasing process costs
- 20% improvement in labor productivity

Let's uncover where the value will lie for you

Beyond those numbers, we know that no two digital transformation projects have the same starting point or end point. And we know every project needs a partner that is committed to your success.

Our value engineering program helps you capture potential cost savings and paths to additional revenue, mitigate risks and ensuring the business case and delivered value are aligned to or your strategic goals.

The process of value:

01 Value discovery **02 Value proposal** **03 Value delivery and value realization**

Contact us today to identify concrete ways to bring value to your organization

EBOOK

About Octave

Octave is a leader in enterprise software, turning data into decisive action and intelligence into your edge. Our software solves for and simplifies complexity, from the design and build to operations and protection of people, property and assets – for any scope, at any scale. For decades, we've partnered with customers to sharpen performance, elevate efficiency and amplify results. From factory floors to entire cities, our solutions are tuned to scale up what's possible from day one onward.

OCTAVE