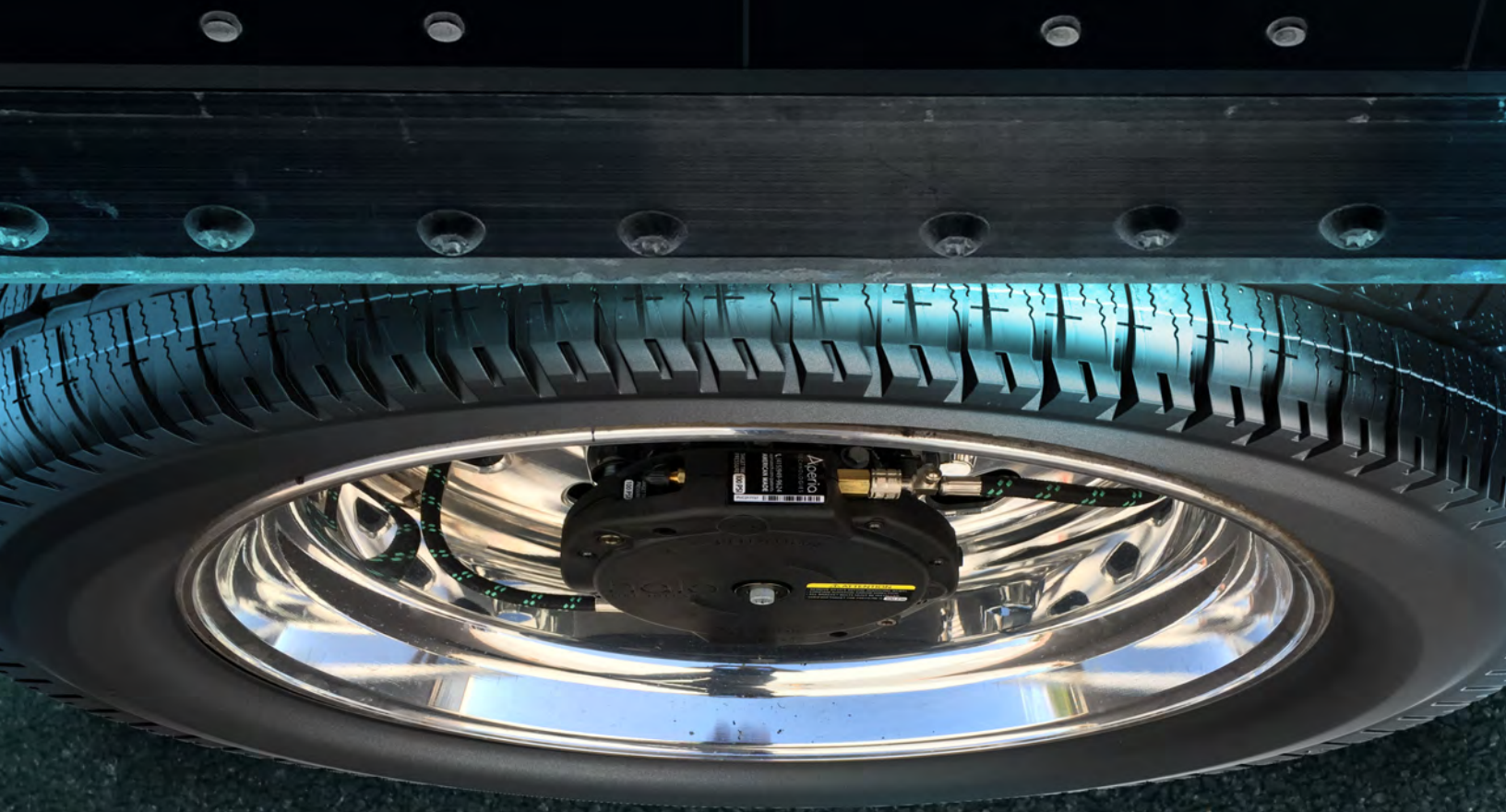
Aperia TECHNOLOGIES

BREATHE MORE LIFE INTO YOUR TIRES

A Comparison of Tire Pressure Monitoring Systems and Halo Connect



SPECIAL REPORT

It takes years to grow a trucking fleet from the ground up.

You have to navigate economic downturns and a never-ending maze of regulations to create a successful business. However, the industry gets more competitive each year, and there is a dizzying array of new safety and efficiency products making bold promises about how they will enhance your operations. It can often feel overwhelming, and when it does, it often makes sense to go back to the beginning and focus on the basics.

No matter the truck or trailer you utilize, tires are the common thread that binds us together on our nation's highways. Tires are far from the flashiest piece of equipment, but truly are among the most important. If you don't agree, just ask anyone on the side of the road with a flat. Despite the high volume of tires fleets must regularly purchase and maintain, how much do you truly know about them at any given time? When was the last time each was serviced? Are any of them currently leaking air, waiting to surprise a driver a few miles down the road?

Of course, professional truck drivers do an admirable job every day checking equipment and maintaining high levels of safety. Maybe you've equipped them with a basic tire pressure monitoring system (TPMS), thinking that provides a greater peace of mind. But is that enough?

For the growing number of fleets that have installed the Halo Connect tire inflation and analytics platform from Aperia Technologies, they already know the answer to that question and it is, "No!" At its core, Halo Connect enhances fleets' most important asset by detecting and addressing tire issues: TIME.

By combining active inflation and machine learning-powered analytics to correct tire problems before they occur and predict when maintenance is required, Halo Connect immediately improves productivity, extends tire life and boosts fuel efficiency. Think of it as a self-powered smart watch for proactive tire management that helps you achieve a predictable maintenance program and unlock enhanced capacity and revenues.

One thing is certain – you'll never look at your tires the same.

Inflation Basics and the Impact on Operations

Successful trucking fleets have long known that traditional tire pressure maintenance practices, which rely on having drivers manually check pressures, are not sufficient to keep tires at the optimal levels.

And while industry adoption of safety and efficiency technologies continues to accelerate every year, some may still question if these products are truly worth the up-front investment.
It is indisputable that maintaining proper tire inflation reduces the risk of unexpected vehicle breakdowns, and contributes to improved fuel efficiency, reduced tire wear and longer casing life. However, there will always be situations where a tire issue is unavoidable, such as after striking debris on a highway. Too often, however, motor carriers are simply unaware their tires are not properly inflated, which is the largest cause of non-hazard-related tire failures.

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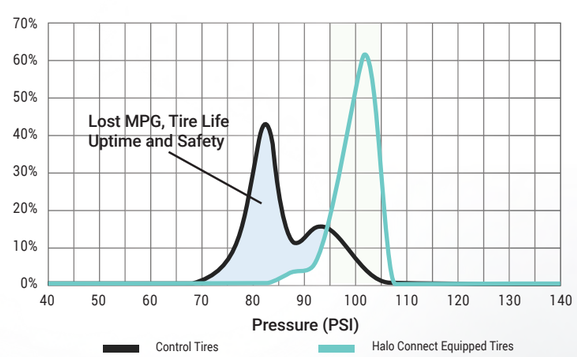
Research from the Technology & Maintenance Council (TMC) of American Trucking Associations (ATA)[1] discovered that approximately one out of five commercial vehicles are operating with one or more tires underinflated by at least 20 pounds per square inch (psi). In addition, only 46% of all tractor tires and 38% of all trailer tires are within plus or minus 5 psi of the target pressure. The group has also recommended that any tire found to be inflated to less than 80% of target pressure should be inspected, and that a tire underinflated by 50% or more should be considered flat.

Tire Pressure Distribution with Halo Connect vs. Control



Underinflation leads to an estimated 10% to 12% degradation in wear for an individual tire which is 10 psi underinflated, and a 1% dip in fuel economy for a vehicle running with all tires underinflated by 10 psi. With fuel accounting for as much as 25% of a fleet's total operating costs, underinflation directly leads to significant added expense at the pump. That is true regardless of current per-gallon diesel prices. At the same time, tire prices are continuing to increase, placing even further pressure on the bottom line. [2]

Developing tire problems are often invisible – or at least not easily detected by the naked eye – and can quickly lead to failures if not caught early. A recent study found the average fleet ran just over 33,000 miles between unexpected breakdowns, meaning that it's not a matter of if, but when, a problem will occur. [3]

Fleets that fail to proactively handle tire and other preventable maintenance concerns almost always come to regret it. Research from TMC and FleetNet America found the cost of an unscheduled truck repair averages nearly $500 – a figure that continues to rise each year.[3] It should be no surprise that tires are among the components most often responsible for these unplanned roadside repairs.

(1) https://www.lexissecuritiesmosaic.com/gateway/FedReg%-Study_20Group_20Information_20Reports_Tire_20Pressure_20Montoring_20and_20Inflation_20Maintenance_E2_80_94TMC_20I.R._202010-2.pdf

(2) https://nacfe.org/technology/tire-pressure-monitoring-tractors/

(3) https://www.trucking.org/news-insights/study-finds-miles-between-breakdowns-vary-widely-sector

(4) https://csa.fmcsa.dot.gov/documents/fmc_csa_12_009_basics_vehmaint.pdf https://www.tire-review.com/avoiding-csa-violations/

The financial impacts of not having properly inflated tires go far beyond unplanned breakdowns and degraded fuel economy and tire wear. Tires continue to be among the most frequent infractions cited as part of the federal government's Comprehensive, Safety, Accountability (CSA) program. These violations hit the overall safety scores of both the driver and the fleet.[4]

With the entire industry continuing to struggle with hiring qualified, professional truckers, keeping them satisfied and rolling down the highway is as important as ever. The constant threat of driver turnover and strict hours-of-service (HOS) regulations means an inability to provide adequate, modern equipment will have them seeking open positions with the competition.

Proper tire inflation also reduces the chance of tire damage while in-transit, and that shipments arrive on time. That helps develop long-lasting relationships with shippers and customers, and helps further build a positive reputation for your company. Likewise, a fleet's public image could potentially be damaged if a truck is involved in a highway accident caused by a tire blowout.

Looking ahead, greenhouse gas and fuel economy regulations from the Environmental Protection Agency (EPA) and the National Highway Traffic Safety Administration (NHTSA) for commercial vehicles are poised to transform industry efficiency over the coming decade, and makes proper tire inflation a necessity to remain in compliance.

Shortcomings of TPMS

In today's just-in-time delivery environment, a glaring shortcoming of tire pressure monitoring systems is that while they report pressure, they cannot proactively take steps to fix a potentially dangerous situation.

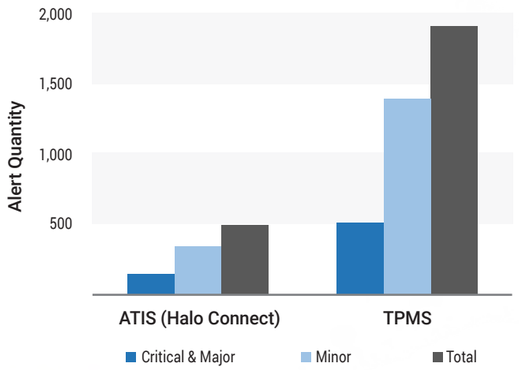
These systems traditionally monitor each tire based on a pre-set level, and issue alerts based on the difference between that target and the actual measured pressure. While it is a positive that these reactive systems alert the driver to a problem, threshold-based alerts do not reveal whether a tire is leaking or just has not been serviced recently. That means it still falls on that driver to further diagnose the problem, if even possible, and report it back to the office.

Even with systems that can automatically inflate a tire when it loses air, it may not be able to accurately alert drivers whether it can safely maintain proper pressure without additional actions. In the absence of leak classifications, fleets can only be alerted to issues but do not gain any insight into just how quickly technicians need to respond to avoid downtime.

This results in disruptive and costly downtime for more vehicles due to the extended time it takes to diagnose – and then fix – each tire problem uncovered.

A fleet study illustrates the real-world impact of active inflation combined with predictive alerts. After using Halo Connect, the overall number of alerts requiring attention declined by about 75%. On a per-truck basis, that translates into 3.4 alerts per truck annually with Halo Connect, compared with 16.5 alerts per truck with a basic TPMS. Projecting that out over a five-year period, the fleet estimated total tire maintenance costs would be two-and-a-half times lower with Halo Connect than with a TPMS as a result of reduced labor, tire damage, and unplanned maintenance.

TPMS Sends 385% More Alerts than Halo Connect



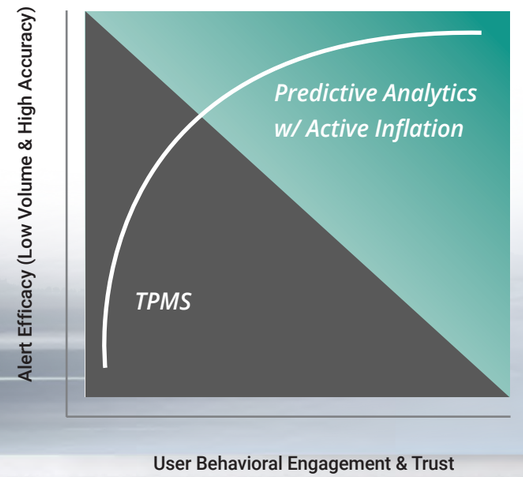
There are other clear differences. Many carriers express frustration that tire pressure monitoring systems are frequently strapped directly to the wheel rim. They can often be lost during maintenance, are tricky to be installed properly, susceptible to corrosion and easily damaged.

Likewise, drivers, technicians and other employees must be able to quickly understand a slew of signals and warnings. Otherwise, the system's usefulness is immediately undercut. Many fleets have found when a tire pressure threshold is set too high, drivers can be inundated with alerts, leading them to tune out the noise and not take corrective actions. Conversely, a decision to set the threshold too low may not provide enough warning of an imminent tire failure, further undercutting the goal of the technology.

This stark reality has been documented in a research paper that evaluated how human nature reacts to the "cry wolf effect." In looking at meteorological forecasts, this technical study warned against prescriptive models, which anticipates how a user should respond to a warning.

Even if viewed as high value, when warnings occur too frequently, user engagement, trust, and compliance rapidly decline. Instead, the paper recommends factoring in likely user responses, especially to false alarms, when determining the value of forecasting models.

The Impact of Alert Efficacy on Trust



In conclusion, the authors of the study noted the real value is the difference between the average cost incurred when the forecasts are used, compared with the average cost incurred in the absence of forecasts.

While there is a little to be concerned about if a meteorologist incorrectly predicts rain tomorrow, the outcome could be far more dire for the truck driver who fails to react to a tire pressure alert because he or she believes it is only a false alarm. The study illustrates the most significant flaw with TPMS: No matter how a fleet tweaks the system, ultimately the technology becomes ineffective as soon as users begin to lose trust.

Understanding Halo Connect

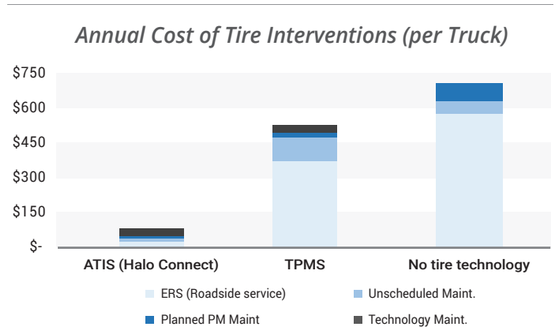
Even before Aperia formally launched its wheel-mounted Halo tire inflation system, the company had already been deploying sensors to capture data and build its analytics engine. The years of machine learning and training algorithms across diverse fleet applications are the building blocks to the Halo Connect tire analytics platform, which launched in 2019.

Unlike a traditional TPMS, Aperia's proprietary algorithms factor in countless variables, detecting problems far in advance of a pressure gauge or TPMS system. Once installed, Halo Connect immediately reduces the number of alerts and warnings by a whopping 75%, compared with traditional systems.

Halo's algorithms recognize how individual tires are performing, and can correct potential problems in real time, such as slow leaks, without any input from human interaction. Fleets regularly credit Halo Connect for eliminating four-fifths of all health issues with their tires. In cases where more serious warnings are warranted, drivers and fleet officials are notified more than 60% earlier than TPMS systems while tires are still well within their target pressure range.

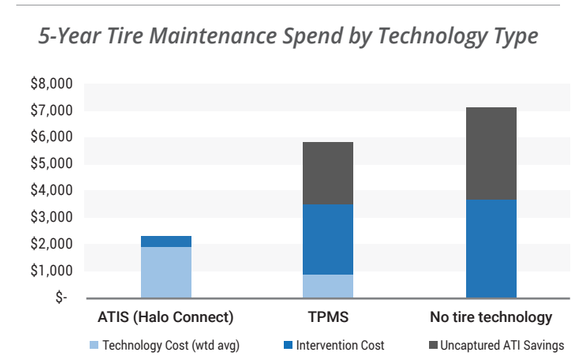
By flagging problem tires before they drop below the target pressure and categorizing maintenance issues by severity, fleets can greatly reduce downtime through more efficient and cost-effective maintenance planning.

When all factored together, there is a greater than 90% reduction in roadside calls, freeing up technicians to work on more pressing equipment problems across the fleet.



While these results speak for themselves, it barely scratches the surface of Halo Connect's true potential in revolutionizing tire management for fleets. Data is continually captured by the system and compared with historical markers to spot early warning signs of potential failures. It also helps determine the best tire make and model for individual vehicles, based on duty cycles, routes, shipments and other factors. Likewise, fleets can better reach the mileage figures promoted by tire manufacturers, something many struggle to achieve.

All of these features enable fleet managers to confidently make decisions about where and when to service tires, minimizing disruptions and maximizing equipment utilization.



In situations that require immediate action, drivers can be rapidly re-routed to service locations, where technicians have already been alerted to the problem and are prepped to minimize downtime. At the same time, the health of every tire in the fleet can be accessed with the click of a mouse, while confidently knowing the target tire pressure is best for wear, braking, handling, comfort and fuel consumption at all times and under all conditions.

These capabilities can turn your tire program into an "intelligent" tire network overnight, serving as a great enabler of enhanced operations for your fleet.

These enhancements will only accelerate as Halo Connect continues to mature and incorporate other features such as terminal-specific tire program performance tracking, supplier performance tracking, API integration capabilities, full trailer connectivity, global support infrastructure and tire casing asset management.
All of these offerings make it clear that unleashing the power of Halo Connect can turn what used to be one of the most uncertain areas of your business into one that brings a higher level of safety and financial security than ever before.

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