



LINUXENS SATELLITE STICKER

A Breakthrough in Sustainable Asset Tracking

USE CASE



INTRODUCTION: SEEKING SUSTAINABLE SOLUTIONS FOR GLOBAL LOGISTICS

We've witnessed a boom in global trade in recent decades, opening up incredible economic opportunities worldwide. Yet, this growth has also raised critical questions about sustainability and highlighted an urgent need for more efficient, reliable asset tracking solutions.

As a global player in the electronics industry, [Linxens](#) is perfectly positioned to design and bring to market a solution that meets this demand. Established for over 40 years, Linxens has proven skill in delivering innovative, tailor-made solutions, meeting the most demanding technical specifications in connectivity, tracking and authentication to ensure seamless end-user experiences. The company set about creating its [Satellite Sticker](#) with the objective of minimising the consumption of IoT devices and contributing to the reduction of gas emissions in the logistics market.

In this use case, we explore the challenges the Linxens Satellite Sticker seeks to address and how its pioneering design helps to overcome them. We also share how Linxens has collaborated with [EchoStar Mobile](#) to harness the ubiquitous connectivity offered by its [LoRa®-Enabled Satellite IoT Network](#) to ensure reliable, real-time data asset tracking in any location or environment.

There is an urgent need
for more efficient, reliable
asset tracking solutions

BACKGROUND: THE CHALLENGES AROUND SUSTAINABILITY IN GLOBAL SUPPLY CHAINS

Global trade has surged in the last thirty years. According to the [World Trade Organisation](#), it reached over US\$ 30.4 trillion in 2023, a fivefold increase since 1995. This rapid growth has fuelled an ever-expanding network of goods in transit and increased the strain on resources, raising questions about the sustainability of global supply chains.

Alongside logistical challenges, businesses are under increasing pressure to reduce waste, energy consumption, and emissions, making sustainable, innovative tracking solutions more critical than ever.

Ensuring the safe, efficient and sustainable movement of assets across such vast and varied regions comes with substantial hurdles. One of the most pressing challenges is maintaining constant visibility over these assets, particularly in remote or underserved areas, where terrestrial network coverage is often poor or non-existent. A lack of real-time data access not only increases the risk of delays and loss but also prevents businesses from identifying potential problems in transit and addressing them before they escalate, leading to inefficiencies, higher operational costs and a wider environmental impact.

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Risks of Limited Asset Visibility

To illustrate the significance of these problems, here is a closer look at some of the risks involved in asset transit that are amplified by a lack of visibility:



Asset theft and loss

When assets go missing in transit, whether due to theft or misplacement, recovery becomes highly challenging, especially when moving through remote or unmonitored regions. [CargoNet](#) reported 'new highs' in criminal activities impacting the logistics and transportation industry, with a substantial rise of 46% in 2024 compared to the previous year. It documented 925 incidents in the US and Canada alone, with an estimated total loss value of over \$154.6 million. Beyond the immediate financial impact, asset theft or loss can disrupt supply chains, leading to missed deadlines, unnecessary waste and eroded trust with clients and partners.



Delays in transit

Weather, traffic or route deviations can cause unanticipated delays that ripple through the supply chain. Without real-time monitoring capabilities, it is difficult to identify the source of these delays and assess their impact on operations. This lack of visibility can compromise the quality of goods, particularly time- or condition-sensitive items, and contribute to missed delivery windows, dissatisfied customers, wasted resources and ultimately, reduced profitability.



Regulatory non-compliance

Regulatory non-compliance presents a serious challenge, particularly for industries transporting sensitive or high-risk assets, such as hazardous materials, pharmaceuticals, or military equipment. Failure to provide accurate, real-time tracking data may cause violations of international laws and standards, resulting in hefty fines, legal complications, and disrupted operations.



Environmental impact

When assets like perishable goods, pharmaceuticals, or chemicals are exposed to inappropriate conditions during transit, there can be a critical environmental impact. Without precise tracking and monitoring, these items may spoil or degrade, leading to unnecessary waste and financial losses.

Furthermore, inefficient logistics or poorly managed supply chains can contribute to higher carbon emissions, as assets may take longer or less direct routes to reach their destinations, increasing the environmental footprint of operations.

Implementing IoT to Overcome Tracking Challenges

Effective asset tracking is the solution to addressing these issues, but implementing it on a global scale is a complex undertaking. The industry has evolved significantly from relying on manual logbooks and even digital spreadsheets, with IoT sensors and smart operating platforms offering the promise of real-time data access and sophisticated asset management systems. However, achieving seamless and reliable implementation of this new IoT technology at scale comes with a new set of hurdles:



Coverage gaps

For continuous asset tracking across vast regions, IoT systems rely on consistent network connectivity. With just [10% of the Earth's surface having access to terrestrial connectivity services](#), there is a massive coverage gap that needs to be addressed. Satellite IoT offers a viable solution but needs to be integrated into existing systems to enable uninterrupted connectivity for assets in transit.



Power requirements

IoT devices require energy to operate. Many rely on battery power, but when these devices are deployed in remote regions, maintaining uninterrupted power over extended periods becomes a huge challenge. Innovative solutions like low-power network technology, such as LoRa® and NB-IoT, and solar-power devices offer the potential to provide long-term, reliable energy sources.



Scalability concerns

As more and more industries recognise the potential of IoT in asset tracking, deploying thousands or millions of devices becomes a reality. IoT devices or sensors that are overly complex will potentially hinder the widespread] of this technology.



Security challenges

IoT asset tracking systems also face substantial [security challenges](#). The immense amount of data generated by IoT devices can become a target for cyberattacks, leading to potential breaches of sensitive information. Ensuring robust encryption, secure communication protocols, and regular software updates is vital to maintaining the integrity and confidentiality of IoT networks.



Sustainability considerations

With today's pressing climate concerns, sustainability must always be a consideration when implementing new technologies. IoT systems must align with these sustainability goals, whether addressing energy consumption, reducing waste for IoT hardware or supporting lower carbon emissions through route optimisation.

Despite the challenges in IoT implementation, innovative developers and manufacturers are pushing boundaries to deliver solutions that address the need for efficient, reliable, and sustainable real-time asset tracking. Linxens is one of those companies. Its award-winning Satellite Sticker marks a significant advancement not only in seamless coverage but also in prioritising environmental responsibility.

The next section explores how its Satellite Sticker holds great promise for a widespread rollout of IoT asset tracking.

THE SOLUTION: LINXENS' SATELLITE STICKER – A SUSTAINABLE CHOICE FOR RELIABLE ASSET TRACKING

Linxens' Satellite Sticker is a fully independent, flexible and reusable device that enables users to accurately track the location of their assets when moving across vast distances in any environment.

This unique tracking solution product represents a breakthrough in autonomous tracking and data collection. It uses advanced energy harvesting technology and a secure satellite communication protocol that supports sustainability and long-term deployment while providing continuous coverage and safe, real-time data transfer, no matter the asset's location.



Linxens' Satellite Sticker



EchoStar Mobile's EM2050 module

Key Advantages of the Satellite Sticker

Linxens developed the Satellite Sticker in response to the urgent need for sustainable traceability tools. Seeking to address real-world problems, Linxens designed this pioneering device to not only enhance business efficiencies by unlocking new data analysis possibilities but also support reduced consumption of IoT devices and gas emissions in the logistics market.

The key benefits of the Satellite Sticker include:

1 Reliable, real-time connectivity in any location

The Linxens Satellite Sticker leverages EchoStar Mobile's [LoRa®-Enabled Satellite IoT Network](#) to provide unparalleled connectivity, ensuring accurate, real-time location tracking and reliable data transfer even in the most remote regions. Integrating EchoStar Mobile's [EM2050 module](#), the Satellite Sticker benefits from:

Dual-mode transmission: The EM2050 enables direct signal transmission over EchoStar Mobile's licensed S-band spectrum and terrestrial networks. With the capability for seamless switching between networks, it maintains uninterrupted connectivity wherever assets travel.

Comprehensive European coverage: [EchoStar 21](#), a geostationary satellite positioned 35,786 km above Earth, provides continuous coverage across Europe. Its fixed position ensures reliable tracking and communication for assets travelling over vast and diverse terrains.

Resilient, interference-free performance: Connecting over EchoStar Mobile's [licensed S-band spectrum](#), the Satellite Sticker benefits from interference-free, secure connectivity. Additionally, the S-band spectrum is highly resistant to signal degradation caused by adverse weather conditions such as rain, snow, or ice, ensuring dependable communication under any circumstances.

2 Next-level sustainability

The Linxens Satellite Sticker sets a new benchmark in sustainable asset tracking with its fully autonomous, energy-independent design powered by advanced energy-harvesting technology. This innovation eliminates reliance on traditional batteries or external power sources, ensuring long-term, uninterrupted operation in even the most remote and challenging environments.

Advanced energy harvesting: Comprising a compact solar panel, the Satellite Sticker utilises cutting-edge energy-harvesting technology to draw power. This capability not only sustains its operation but also significantly reduces maintenance requirements.

Sustainability at its core: By eliminating the need for disposable batteries, the Satellite Sticker minimises electronic waste, aligning with global sustainability goals and reducing the environmental footprint of asset tracking operations.

Reliable, long-term performance: With its energy-autonomous design, the Satellite Sticker is predicted to last 10-15 years without needing battery replacement. During this time, the device will operate continuously, providing dependable tracking and data analysis without interruptions caused by power constraints.



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Easy deployment and scalability

Simplicity and scalability were two further core concerns when designing the Satellite Sticker. Linxens wanted to ensure that it provided an accessible asset tracking solution for any business. Therefore, its innovative slimline package, measuring just 10cm by 15cm, allows for effortless integration into existing logistics operations.

Quick and simple setup: With its compact, lightweight design, the Satellite Sticker can be easily placed on any pallet or shipment. There's no need for complex installation processes or additional hardware, minimising setup time and enabling rapid deployment.

Scalable for any operation: From tracking a handful of high-value shipments to scaling up to monitor tens of thousands of assets over broad areas, the easy deployment of the Satellite Sticker supports growth and expansion at any rate.

Versatility across industries: The Satellite Sticker's compatible design makes it suitable for a wide range of applications, including logistics and manufacturing, agriculture, and pharmaceuticals. Moreover, its robust, reliable tracking capabilities make it a go-to solution whether assets are moving over land, sea or any harsh outdoor environment.

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End-to-end secure solution

Linxens offers more than just cutting-edge tracking hardware; its Satellite Sticker comes with a complete, secure, and user-friendly ecosystem designed to empower businesses with full control over their asset data. By combining advanced security measures with a robust suite of management tools, the Satellite Sticker makes up a valuable end-to-end solution.

Secure Communication Protocols: The Satellite Sticker employs industry-leading secure communication protocols to safeguard data during transmission. These protocols ensure that sensitive location and tracking information remains encrypted and protected from unauthorised access, providing businesses with peace of mind in today's cybersecurity landscape.

Complete SaaS Ecosystem: Linxens complements its hardware with a powerful Software-as-a-Service (SaaS) platform and an accompanying API. These online tools enable businesses to easily manage, analyse, and integrate asset data into their existing systems, delivering actionable insights in real time.

Enhanced Data Management: With all metrics delivered to a centralised dashboard, businesses have complete visibility of their assets' progress. Its intuitive interface and integration capabilities simplify workflows and improve operational efficiency.

The features of Linxens' Satellite Sticker position it as a transformative tool in asset tracking. Offering advanced connectivity, sustainability and security alongside ease of use and scalability, it addresses the most pressing challenges businesses face in the transit of their assets. With this device, companies can not only enhance operational efficiency but also align with modern sustainability and data management standards, ensuring they stay ahead in an increasingly competitive global market.



REAL-WORLD APPLICATIONS OF THE SATELLITE STICKER

The Linxens Satellite Sticker has a wide range of applications, making it a versatile solution for businesses across numerous industries. Its compact, easy-to-use design, reliable connectivity, and sustainable energy independence make it ideal for tracking assets in challenging environments.

Here are a few key examples of its practical uses:

- **Logistics and supply chain management:** The Satellite Sticker provides real-time visibility into shipments, ensuring accurate tracking of goods across land or sea. This capability is particularly valuable for companies managing high-value or time-sensitive shipments, where delays or losses can have significant impacts.
- **Agriculture:** With its autonomous energy capabilities supporting long-term usage, the Satellite Sticker is perfect for tracking equipment, vehicles, and even crop shipments in remote farming areas, improving efficiency and reducing operational risks.
- **Pharmaceuticals and healthcare:** The Satellite Sticker ensures secure and reliable location tracking of high-value medical supplies and pharmaceuticals during transit. Having this real-time data helps maintain supply chain integrity and supports compliance with regulatory requirements for the safe delivery of healthcare products.
- **Manufacturing and Industrial Operations:** By providing visibility into the location of machinery, tools, and raw materials, the Satellite Sticker enhances inventory management and reduces downtime in complex manufacturing processes.

These are just a few examples of how the adaptability and advanced features of the Satellite Sticker can be harnessed to drive efficiency, sustainability and profitability. However, its capabilities and benefits extend to virtually any sector that requires reliable visibility of its assets in transit.

THE FUTURE OF ASSET TRACKING: SMALLER, SMARTER AND MORE SUSTAINABLE

The Linxens Satellite Sticker is set to come to market in the near future, offering immense value for businesses requiring reliable asset tracking for their valuable goods.

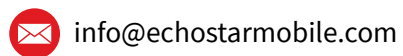
With its innovative design and advanced capabilities, it represents a significant step forward that will not only enhance business efficiencies but also support wider sustainability goals.

Looking ahead, Linxens is already exploring how to reduce the size of its solution even further to offer even greater ease and sustainability benefits while still bringing the same powerful tracking capabilities. As these developments progress, Linxens continues to lead the way in redefining how businesses manage their assets, providing smarter, more efficient tools for a connected and sustainable future.



Want to know more?

For more information, please contact:



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