DESCARTES™

The Future of Air Cargo Tracking

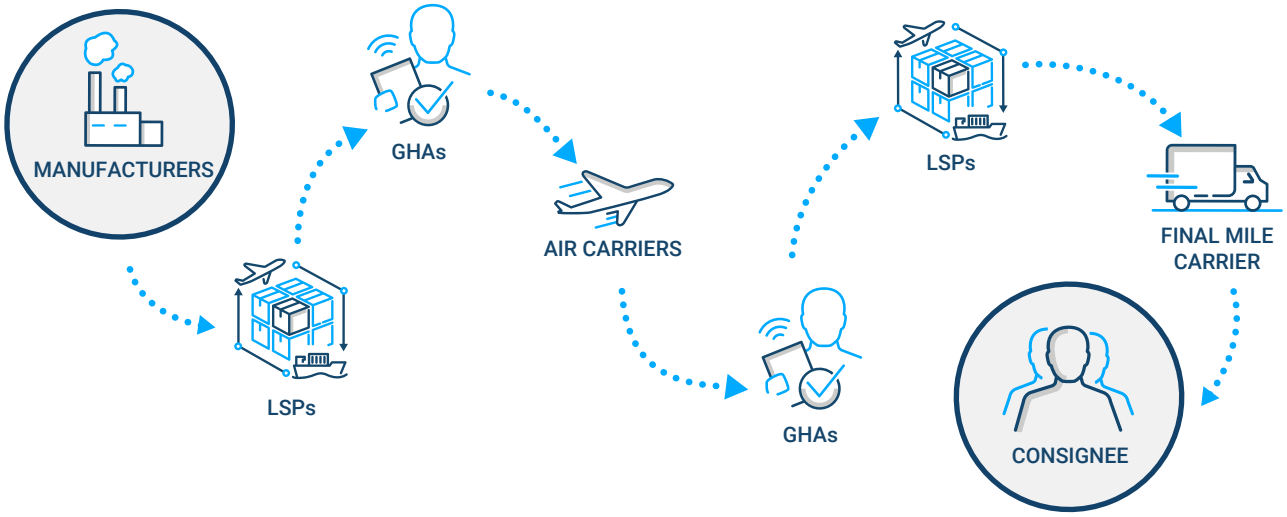
Navigating the Complexities of Air Cargo

Shipping via air cargo has always been the best choice for high velocity, high-value goods such as electronics and pharmaceuticals. However, because of the nature of air cargo, it has always been a complex process with many hand-offs:

1. Air-based shipping is a multi-party process. Including the manufacturer, logistics service providers (LSPs), ground handling agents (GHAs), air carriers, first and final mile carriers and the consignee, there are many parties that touch the shipment and disparate data collection points.

C H A I N O F C U S T O D Y

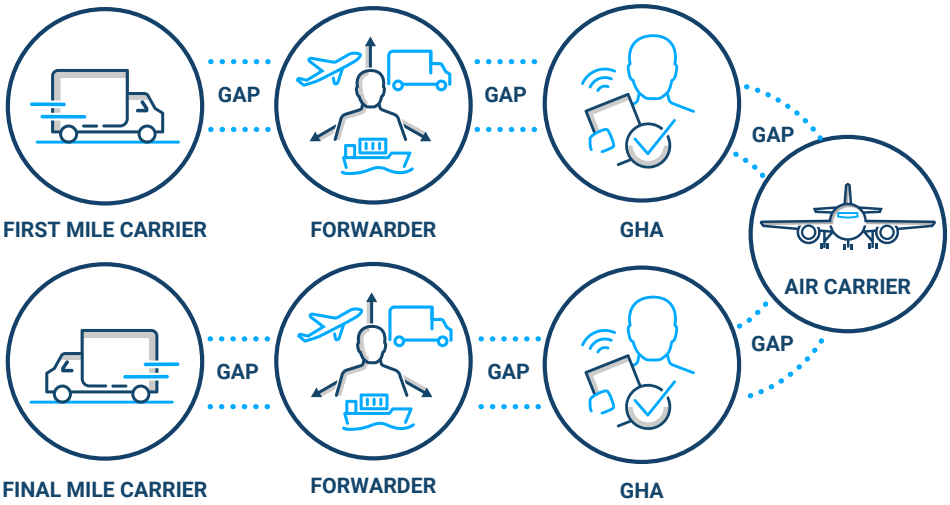
With over seven hand-offs between the manufacturer and the consignee, it is critical to have end-to-end visibility of the location and condition of air cargo shipments.



Shipment condition is important as extreme changes in temperature, handling and storage practices and a number of factors can adversely impact the shipment. For example, IATA reported in 2015 that 25% of all vaccines are degraded when they reach their destination due to improper shipping. With over seven hand-offs between the manufacturer and the consignee, it is critical to have end-to-end visibility of the location and condition of air cargo.

2. Visibility across the entire supply chain is limited because there are gaps in the end-to-end shipment tracking and monitoring processes, and it is impossible to reconcile data coming from disparate systems.

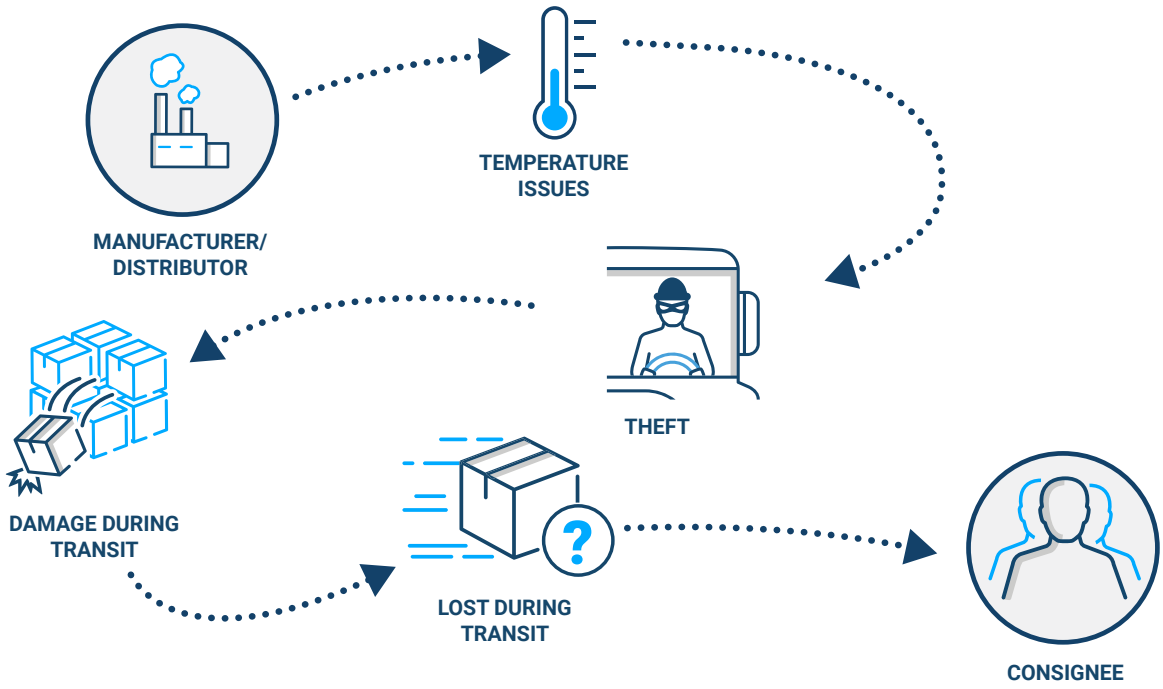
GAPS OF VISIBILITY



3. After-the-fact data logging doesn't provide the manufacturer, distributor or LSP with real-time information as product conditions are deteriorating in order for them to intervene before the product goes bad or track the product's location to ensure it doesn't end up somewhere it shouldn't be.

LACK OF REAL-TIME INFORMATION

The lack of end-to-end real time air cargo visibility can result in product degradation, diversion and even loss of high-value goods.



Leading the Way Forward

Because virtually all air shipments move via logistics service providers, it is up to the logistics community to lead the way in creating a transparent shipment process. To create this transparency, the logistics community must adopt these five principles:

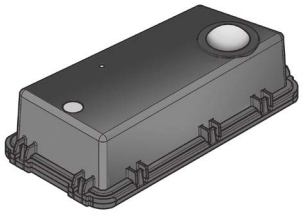
1. **Unify the tracking process across all parties in the supply chain:** Eliminate the gaps and standardize the data for a true end-to-end view
2. **Deploy common tracking technology and open network connectivity:** Ensure tracking across the entire logistics chain despite the numerous hand-offs
3. **Automate data capture:** Improve data accuracy and timeliness, reduce tracking labor
4. **Create a closed-loop process for reusing tracking tags:** Reduce tracking costs and improve sustainability of the logistics chain
5. **Proactively provide manufacturers and distributors with location and condition status:** Proof of chain of custody and product integrity while providing more dynamic deployment decisions

Transforming the Logistics Chain

Recent Internet of Things (IoT) advancements enable the air cargo logistics community to transform the air cargo logistics chain to provide seamless end-to-end location tracking and monitoring. Traditional tracking technologies were expensive, had limited battery life, didn't capture key environmental statuses, had tracking "holes", were company-centric instead of logistics chain-centric, and were not environmentally friendly. As a result, they were not widely deployed however, next generation IoT has the elements that make global tracking of air shipments a reality.

Next generation tags

By taking advantage of advances in electronics, devices now offer a smaller form factor, are easier to deploy, less expensive to produce, are more rugged, have a longer tracking range and battery life, and are recyclable. Equally important is the range of tracking status that they capture. It is not limited to location anymore and includes data capture on temperature, humidity, light, shock and smoke to provide a more comprehensive view of the health of the shipment.



Next generation sensor-based tracking tags can be attached to high-value shipments to better monitor shipment conditions.

Mesh networks

Traditional tracking networks are expensive to deploy and provide limited coverage, which leaves tracking gaps in the air cargo logistics chain. Mesh networks fill in the "blank spaces" because they are lower cost to implement as they require minimal internet connections. In addition, they can be deployed more widely because many mesh devices can run on solar power instead of electricity. Mesh networks are more resilient because of overlapping coverage and the use of multiple paths to move data. They can be located across the logistics chain in airports, air cargo stations, loading/unloading docks, etc. to automatically capture the movement and status of shipments.

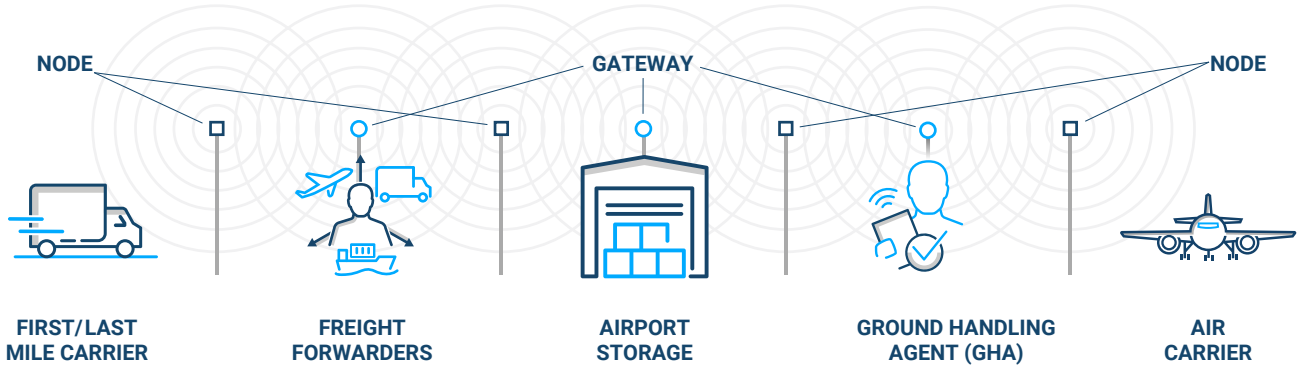
What is a mesh network?

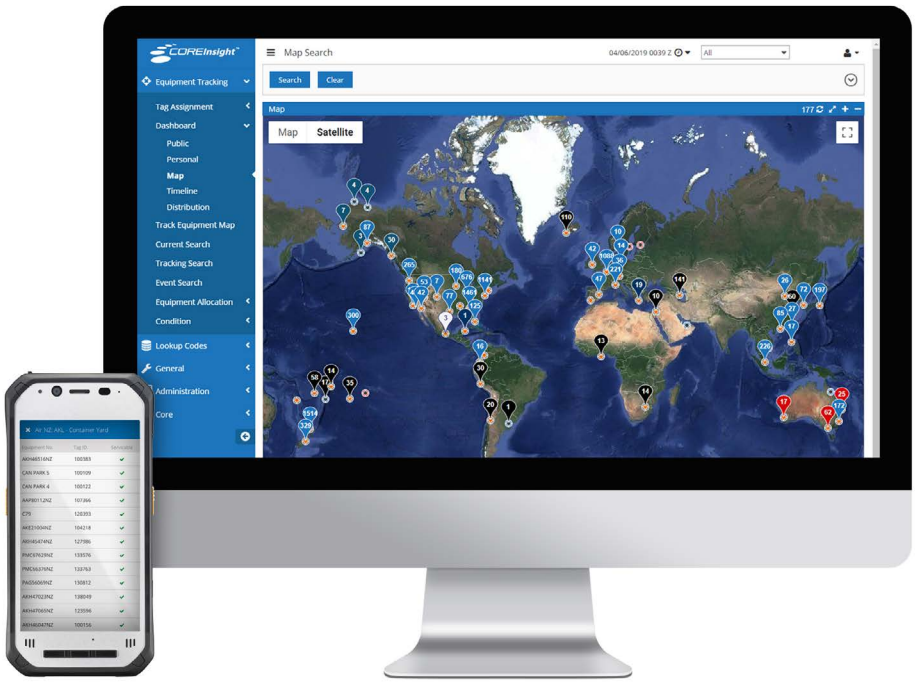
A mesh network is a local network topology in which the infrastructure nodes connect directly, dynamically and non-hierarchically to as many other nodes as possible and cooperate with one another to efficiently route data from/to clients."

(Wikipedia)

MESH NETWORK COVERAGE

Mesh networks provide more complete coverage at a lower cost. Nodes are connected to active gateways to transmit information outside of the mesh network. Overlapping coverage results in the elimination of coverage gaps.





Advanced cloud-based platforms and mobile applications can better capture data, eliminate data silos, and enable better decision making.

Mobile Applications

While mesh networks extend the ability to automatically track shipments across the logistics chain, mobile apps are needed to extend the tracking process and make it truly door-to-door. Because smartphones are a global phenomenon, they can provide greater flexibility to capture data, receive or deliver shipments, or interrogate shipment status on-demand. In addition, any size of logistics organization can participate in the air cargo logistics chain by simply visiting the major application stores and downloading the tracking app.

Cloud-based Tracking Platform

Providing a common repository that unifies the end-to-end tracking data from all of the parties involved in the air cargo logistics chain is essential to eliminating the silos of tracking information that exist today. With one version of the truth, all participants will know the status of a shipment and be able to use that information to make better decisions about managing it effectively. The cloud is the perfect technology for the tracking platform because of its accessibility and scalability.

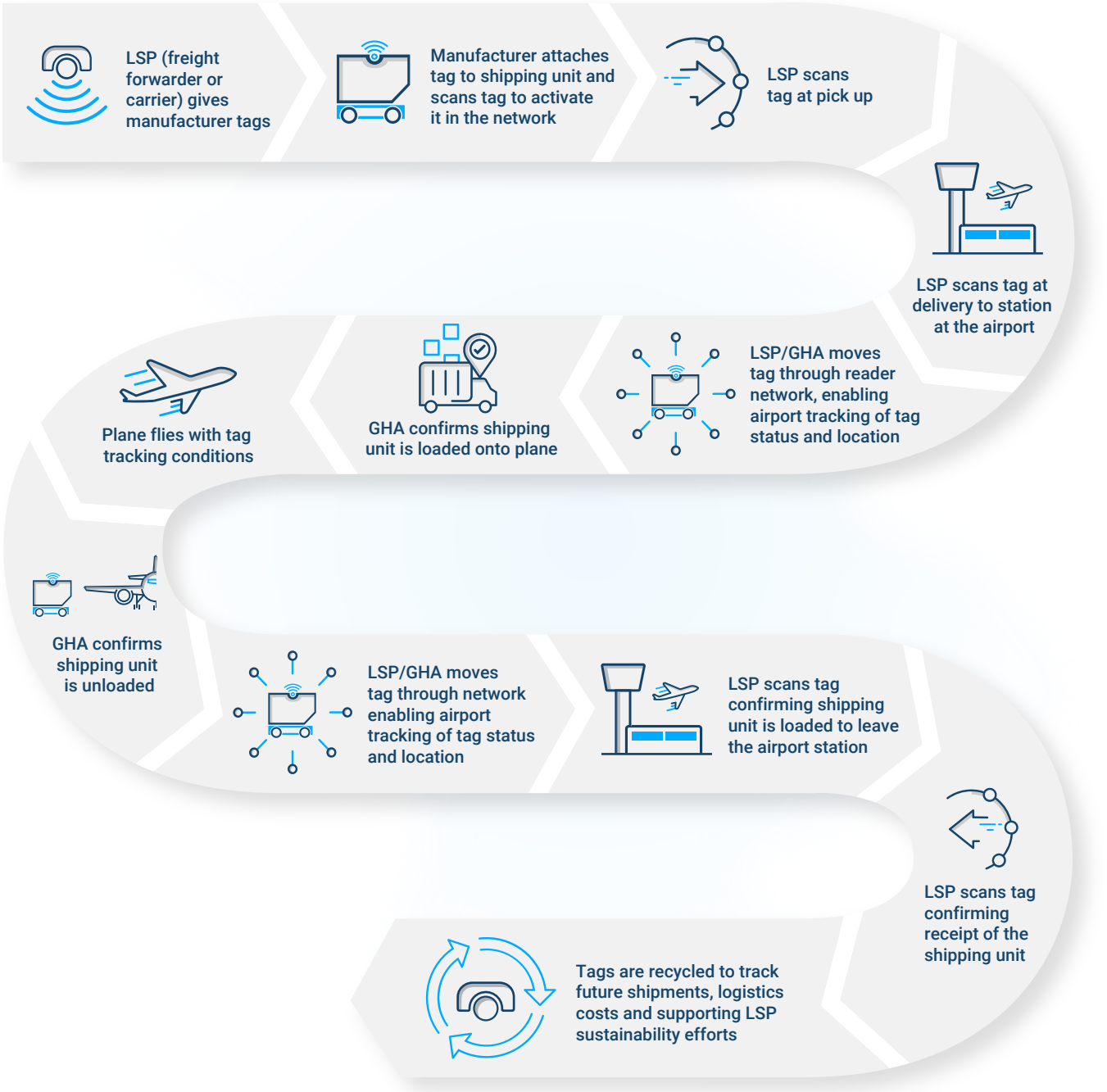
Open Architecture

Because of the number of participants in the air cargo logistics chain and the global nature of manufacturing and distribution, interoperability is going to be critical as no one technology provider will be able to deliver all of the tags and tracking hardware required. The tracking network must allow any technology provider that meets tag or tracking standards to participate. This will increase the velocity of deployment, foster innovation and help to keep costs down. In addition, there should be flexibility to deploy various mobile applications that capture shipment status as part of broader logistics activities and then pass that information to the cloud-based tracking platform.

Creating End-To-End Visibility for the Air Shipment Logistics Chain

E N D - T O - E N D V I S I B I L I T Y I L L U S T R A T I O N

Technology is essential to monitor the condition and location of shipments as they move through multiple hands-offs to enable end-to-end visibility.



Conclusion

Simplicity, resiliency, pervasiveness and interoperability are the key requirements to establish true end-to-end air cargo visibility across the multi-party logistics chain. Advances in IoT capabilities and advanced network strategies make it possible for the air cargo logistics community to meet these requirements now. The result will be a more safe, secure and efficient logistics chain that will meet the upcoming challenges of high-value goods distribution.

How Descartes Can Help

As a logistics professional in the air cargo supply chain, if you want to know how your organization can use advanced IoT technology to help deliver end-to-end shipment visibility, contact Descartes. Descartes is a leading provider of technology solutions to the air cargo community and a long-standing innovator in the digital evolution of the industry. We operate one of the world's largest air cargo messaging networks and provide technology solutions that streamline cargo tracking, shipment management and customs clearance for carriers, forwarders, ground handling agents and other logistics organizations.

About Descartes Systems Group

Descartes (Nasdaq:DSGX) (TSX:DSG) is the global leader in providing on-demand, software-as-a-service solutions focused on improving the productivity, performance and security of logistics-intensive businesses. Customers use our modular, software-as-a-service solutions to route, schedule, track and measure delivery resources; plan, allocate and execute shipments; rate, audit and pay transportation invoices; access global trade data; file customs and security documents for imports and exports; and complete numerous other logistics processes by participating in the world's largest, collaborative multimodal logistics community. Our headquarters are in Waterloo, Ontario, Canada and we have offices and partners around the world.

Learn more at www.descartes.com and connect with us on LinkedIn and Twitter.

Contact Descartes to learn how to achieve end-to-end visibility across the air cargo logistics chain.

Talk to an Expert

Uniting the People & Technology That Move the World.