



The Air Cargo Leader's Guide to Choosing the Right ULD Tracking Solution



Introduction

In air cargo, every misplaced or lost ULD results in significant costs and missed opportunities. Yet air cargo companies remain trapped in a cycle of reactive firefighting: 5% of ULDs are estimated to be missing at any one time. Outdated legacy systems, manual errors, and operational inefficiencies are all at play, triggering cascading supply chain failures.

The stakes in ULD tracking have never been higher. Choose the wrong solution and you risk wasting valuable capital, time, and resources on technology that lacks the ability to integrate with your systems and provide accurate and actionable data. You'll also risk being straddled with technology that becomes obsolete in the coming months or years.

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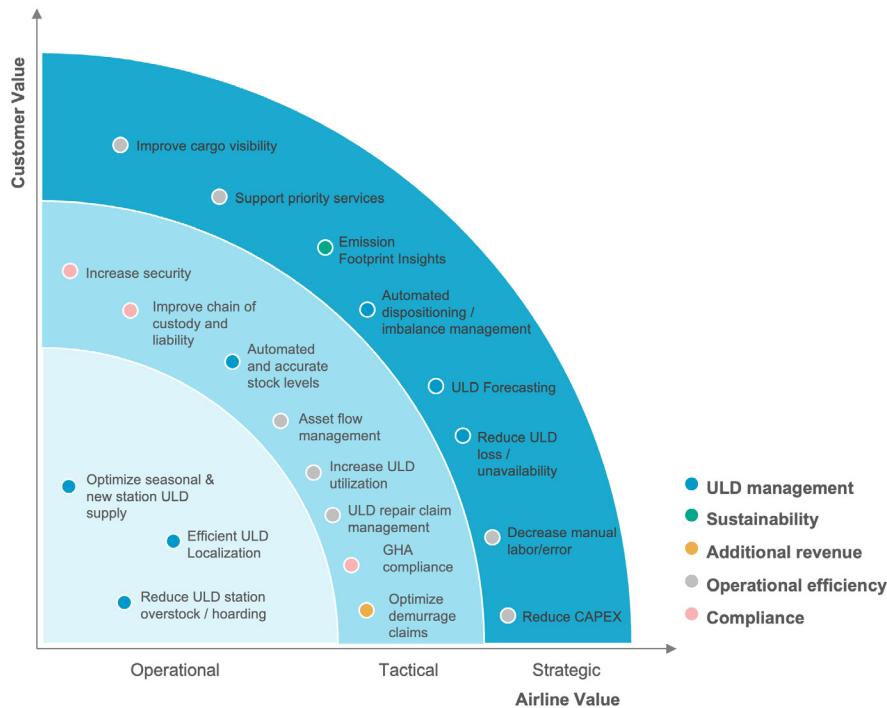
“8 make-or-break criteria for selecting the best supplier,”

This guide cuts through the hype. We analyze **eight make-or-break criteria** used by air cargo leaders to find the right ULD tracking solution to:

- Eliminate blind spots and take control of your global ULD fleet
- Reduce ULD loss and costly repositioning
- Automate manual processes and reduce admin workload
- Improve fleet utilization and forecasting, ensuring the right ULDs are in the right place
- Lock in ROI at scale through proven, scalable, future-ready solutions

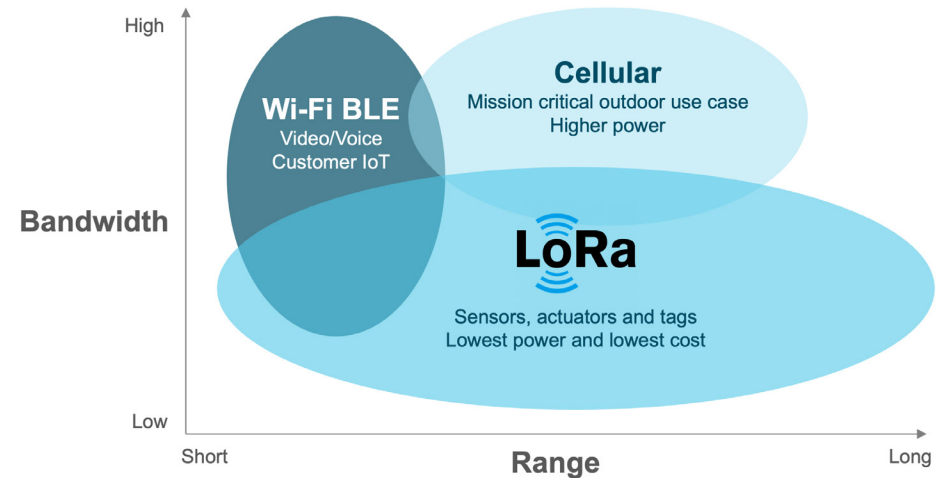
One Size Doesn't Fit All

ULD tracking solutions impact multiple teams — operations, IT, compliance, procurement, and finance — and each will have different priorities. What matters most to a ground handler may not be the same as what matters to a fleet manager or CTO. That's why choosing the right solution starts with understanding your specific operational needs and internal stakeholders' goals.



There's No Single "Best" Technology

From BLE to LoRa to LTE-M, each tracking technology comes with its own strengths and trade-offs. Some offer real-time visibility but higher costs; others deliver long battery life but reduced data frequency. The key is not finding the "best" technology, but the right one for your operation. That means aligning the technical capabilities of each option with your use cases, operating environment, and business objectives.



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For large-scale ULD tracking, LoRa and BLE provide a balance of range, battery life, and cost-efficiency, while LTE-M is best for real-time global tracking but comes with higher costs and battery constraints.

Technology & Features: Finding the Right Balance

The foundation of any ULD tracking solution is its underlying technology—determining how accurately, reliably, and efficiently ULDs are monitored. While RFID is an established technology, modern tracking solutions often use BLE, LoRa, LTE-M or a combination. However, each technology has trade-offs that must be carefully considered.

TECHNOLOGY OPTIONS: PROS & CONS

Technology	Pros	Cons
RFID	Low-cost, widely used for warehouse tracking	Very short range (<1m), requires infrastructure
BLE (Bluetooth Low Energy)	Cost-effective, energy-efficient, compatible with mobile/tablets	Limited range, requires extensive infrastructure
LoRa (Long Range, Low Power)	Long-range, low battery consumption, scalable, reliable both indoors and outdoors	Location accuracy needs to be configured
LTE-M (Cellular)	Global coverage, high data throughput	High battery consumption, expensive network costs

KEY CONSIDERATIONS



Accuracy & Reliability

Does the system provide precise real-time location updates? Can it operate effectively in both indoor and outdoor environments?



Scalability

Will the solution work across multiple airports, cargo hubs, and regions without excessive costs?



Battery Life & Range

How long can the tracking device last before needing maintenance or replacement? How far does the technology transmit? What's the cost of the infrastructure needed as a result?



Compatibility

Does the system integrate with different ULD types without modifications? Can it integrate with existing software and systems? Are there any regulatory restrictions?



Data Transmission

How often does the solution transmit data? And with what accuracy?

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For comprehensive airport coverage, a LoRa 2.4GHz + BLE hybrid approach offers the best mix of indoor and outdoor tracking, while LTE-M is valuable for visibility in locations with cellular connectivity.

Network Coverage: Ensuring Seamless ULD Visibility

A tracking solution is only as good as its network coverage. Many ULD losses and inefficiencies stem from inconsistent tracking across regions and location types. It's important to consider both range and ability to track indoors and outdoors as well as the global gateway network.

WHAT TO LOOK FOR



Airport Coverage

Does the provider cover major cargo hubs and airports worldwide?



Gateway Network

Has the provider a well-established gateway network? How many and where? Does their network cover just airports or also warehouses?



Multi-Region Capability

Can it track ULDs across multiple geographies without connectivity gaps?



Indoor & Outdoor Tracking

Does the solution work within warehouses, cargo/passenger terminals, and on tarmacs?

COMPARING NETWORK OPTIONS

Network Type	Best Use Case	Limitations
LoRa 2.4GHz Gateways	Long-range ULD tracking at airports and surrounding warehouses	Requires local infrastructure deployment, however long-range means less gateways needed
LoRaWAN	Open air environments	Operates on different frequency bands across the globe, making it not suitable for global logistics
BLE (Bluetooth Low Energy)	Short-range ULD tracking at airports and warehouses. Ideal for tracking with mobile/tablet	Requires local infrastructure deployment, short range means more gateways are needed
LTE-M (Cellular)	Global tracking, seamless transitions between regions	High data costs, limited indoor tracking

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Form Factor: Design, Durability & Deployment

Form factor plays a critical—yet often overlooked—role in the success of ULD tracking solutions. Even the most advanced tracking system can become a liability if it's fragile, complex to install, or incompatible with standard ULD operations. Poor design choices can lead to slow deployment, premature device failure, operational delays, or even the need to recertify ULDs after modifications.

WHAT TO CONSIDER



Durability

Is the device built to endure harsh environments, the physical demands of ULD operations, and extreme temperatures?



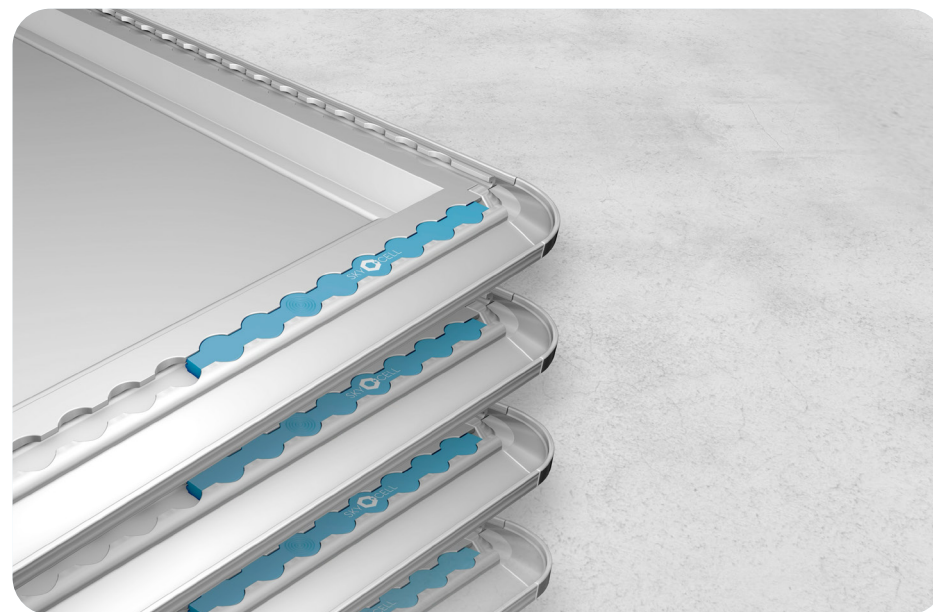
Non-Intrusive Installation

Does the device require drilling or structural changes to the ULD that could impact certification? Can you simply click or stick on the tracking device? Solutions that do not affect ULD certification can be installed in-field, offering flexibility and eliminating the need for sending ULDs back to Part 145 approved repair stations for installation, saving both time and cost.



Form Factor Compatibility

Is the tracking device tailored to standard ULD designs and mounting points?



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Choose a solution with a compact, durable, and ULD-friendly design. Certified, non-intrusive devices that are easy to implement at scale will reduce downtime, simplify operations, and accelerate ROI.

4

Data & Analytics: Turning Tracking into Actionable Insights

The value of ULD tracking extends beyond real-time location—once you have accurate data, what can you do with it? The right analytics help airlines optimize fleet utilization, reduce repositioning costs, and improve decision-making.

MUST-HAVE DATA FEATURES



Real-time Data Availability

Immediate access to ULD location and condition updates



Predictive Analytics

AI-powered insights to forecast ULD demand and optimize distribution



Reporting & Compliance Logs

Automated reporting for audits and operational efficiency



API Integration

Compatibility with different airline systems



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The best tracking solutions combine real-time data, predictive analytics, and seamless integration to enable proactive, rather than reactive, ULD management.

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Compliance & Industry Standards

Regulatory non-compliance can delay deployment and increase costs.

WHAT TO VERIFY



IATA Compliance

Does the solution meet IATA's ULD tracking and security standards?



Airline Approvals

Is the technology approved by partner airlines (e.g., DO-160G)?



Data Security Compliance

Does the provider comply with aviation cybersecurity regulations (e.g., GDPR, ISO27001)?



Certification-Safe Installation & Maintenance

Does installation involve structural modifications that could void ULD certification? Can maintenance or replacements be performed in-field without sending units to Part 145 repair stations?



DO-160G



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To avoid regulatory roadblocks, choose a provider with proven airline approvals and industry certifications.

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Cost-Effectiveness: Evaluating TCO & ROI

Tracking costs go beyond the hardware price. Consider Total Cost of Ownership (TCO) to evaluate long-term savings. You should also consider the costs of scaling as your tracking needs grow.

KEY COST FACTORS



Hardware and Network Costs

Price per tracking device and expected lifespan? Are there recurring connectivity and maintenance costs for the network?



Leasing

Most providers lease their loggers — what are the running, maintenance, and leasing costs?



Scaling Costs

If you expand your use of the solution, how will your overall costs increase? Will greater scale lead to lower per-asset costs, improving cost efficiency over time?



Operational Savings

Can it reduce manual ULD repositioning, improve asset utilization, and cut labor costs?



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A higher upfront investment in scalable, durable, low-maintenance solutions often results in greater long-term savings.



Services & Support: Implementation and Operation

Introducing a new solution can be an arduous and lengthy process without the right support. With the right provider, both installation and operation should be smooth with dedicated support on hand.

QUESTIONS TO ASK PROVIDERS



Deployment Support

Does the provider offer on-site or remote installation assistance?
How easy is the solution to implement and integrate with your existing systems?



Established Network

Does the provider have an existing or established network that covers your stations for immediate benefit?



Customer Service Availability

24/7 support vs. limited service hours?



Training Programs

Are teams properly trained on how to use the solution?



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Choose a supplier with responsive support, a proven track record of successful deployments, and strong customer feedback.

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Industry Experience: Choosing a Proven Provider

A provider's expertise in air cargo operations significantly impacts the success of ULD tracking and implementation. Generic IoT tracking solution providers may underestimate the complexities of ULD tracking and fail to understand the unique requirements in air cargo. Look for a solution that airlines actually use.

WHAT TO LOOK FOR



Proven Case Studies

Have they successfully implemented solutions for airlines?



Strong Partnerships

Are they working with major cargo handlers, airlines, and industry bodies (IATA, ULD Care)?



Innovation Roadmap

Are they investing in new technology to future-proof tracking capabilities?



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Select a provider with deep industry expertise, a strong reputation, and a forward-thinking innovation strategy.



Conclusion

Finding the Right Fit

In today's fast-moving air cargo industry, ULD tracking is no longer optional — it's a strategic necessity. Control, efficiency, and cost optimization are top priorities for air cargo leaders. The right solution must support the ULD operations of tomorrow, ensuring resilience against imbalanced trade routes, seasonal demand fluctuations, and unforeseen geopolitical events.

By choosing a provider that offers scalable technology, extensive network coverage, and deep industry expertise, airlines can take full control of their ULD fleets, optimize decision-making, and build a more efficient and future-proof operation.

Why SkyCell ULD Tracking?

At SkyCell, we combine cutting-edge IoT technology with deep industry expertise to help airlines and cargo operators take full control of their ULD fleets.

Here's why leading airlines trust SkyCell:



Proven Expertise

Over 10 years of experience in tracking pharma air freight containers.



High Coverage

The largest IoT network with over 250 airports equipped with SkyCell systems, offering unmatched tracking visibility.



Robust & Reliable Loggers

Engineered specifically for air cargo, SkyCell's loggers seamlessly integrate into all types of ULDs.

With best-in-class IoT solutions, a scalable network, and continuous innovation as well as over 150 patents in cold chain and IoT technology, SkyCell ensures long-term reliability for asset monitoring at scale.



TALK TO A SKYCELL EXPERT

