



**HYPERLEDGER**  
BLOCKCHAIN TECHNOLOGIES FOR BUSINESS

# Case Study:

# Honeywell Aerospace creates online parts marketplace with Hyperledger Fabric

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## Company

- Founded in 1914
- Now a global provider of avionics, engines, systems, and service
- Products and services touch virtually every aircraft in the world and in space
- 2018 sales of \$12.9 billion

## Goals

- To create an Amazon-type marketplace for used aircraft parts
- To cut purchasing time from days or weeks down to seconds
- To connect each physical part to its digital pedigree

## Approach

- Model the marketplace on popular e-commerce sites
- Use blockchain to overcome the trust barrier
- Choose an effective blockchain framework
- Set high standards that encourage quick adoption
- Provide a stream of new benefits

## Results

- \$4 million in sales in less than a year
- More than 50 vendors with storefronts in the new marketplace
- Purchase time reduced from days to minutes
- Future boost to anti-counterfeit measures

What happens when an airplane gets too old to fly?

In many cases, operators can harvest valuable parts, especially engines and landing gear. And those parts can be sold, recertified as airworthy, and reused in other planes.

In fact, there's a thriving market for used aircraft parts worth \$4 billion a year and growing.

But until recently, shopping for used aerospace parts was like a trip back to the 1990s.

There was nothing wrong with the parts: Every piece must be carefully documented and certified before being sold.

The problem was the websites put up by vendors.

They looked a lot like Craigslist, only with no prices or images. Only the most basic information, such as a part's condition, was posted online with the seller's phone number.

Even if a buyer found a part they needed, they still had to phone, fax, or e-mail back and forth with the seller to make a deal. That process took days, sometimes even weeks.

To help shift the industry into modern times, Honeywell Aerospace set up a modern-looking and secure B2B marketplace for used aircraft parts called GoDirect Trade™.

Buyers can now browse detailed listings and add items to their online shopping carts. The marketplace quickly took off, recording \$1 million in sales in the first 10 weeks. And every transaction is recorded on an immutable blockchain built with Hyperledger Fabric.

## Modeling on today's popular e-commerce sites

Like many people, Lisa Butters is an experienced online shopper.

But as an IT executive in aerospace, she had some pointed questions:

- Why can't people shop for airplane parts on a modern e-commerce site?
- Why isn't setting up an online store for those parts as simple as Etsy, which even Mom-and-Pop sellers can manage?
- And why isn't shopping for parts as easy as Amazon, with its industry-leading customer experience?

Instead, shopping for used aircraft parts was decidedly old-fashioned. The websites that did exist were dense with text but thin on details. Vital information like specs, service history, pricing, and availability was sketchy. Even photos of parts were rare.

"In this \$4 billion industry, less than 2.5% of all transactions are done online," says Butters. "Think about that. Business is still done the old-fashioned way.

"It used to take two phone calls and four e-mails to close any deal. The process took on average two days. Larger parts could take weeks of sending quotes and exchanging documentation."





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— Lisa Butters, General Manager, GoDirect Trade,  
*Honeywell Aerospace*

Butters is a 15-year veteran of Honeywell Aerospace who rose through various roles in IT and digital transformation. Today she is general manager of Honeywell’s new aerospace parts marketplace, determined to bring a modern online experience to the industry.

“People weren’t used to buying and selling used aircraft parts online,” says Butters. “But the real question was ‘why’? In a world where most of us have purchased something from Amazon before we take our first drink of morning coffee, why have people allowed this industry to be so manual and inefficient?”

## Using blockchain to overcome the trust barrier

To get started, her team studied many of today’s most popular e-commerce sites, drawing up a list of basic requirements that consumers expect.

They also had to pose a fundamental question: Why were so few transactions for used aircraft parts being done online?

The answer: Trust. Or more precisely, the lack of it.

Since aviation is a heavily regulated industry, sales require certification from the U.S. Federal Aviation Administration and other agencies. Each part must be documented with a complete history of its ownership, use, and repairs.

A commercial aircraft can be in service for up to 30 years with five or six owners. And airplanes aren’t getting any simpler. If you count every rivet, the world’s largest passenger jet, the Airbus A380, has about 4 million pieces.

Needless to say, tracking all the information required on all those parts is a challenging, error-prone process. And any uncertified or counterfeit part that snuck into the supply chain could have dire consequences.

“Parts sellers have tried platforms such as Amazon in the past,” says Butters. “But their efforts were unsuccessful because of the nuances and safety regulations involved in the aerospace market.”



For one thing, Amazon couldn't handle the technical documentation required for every part. For another, many buyers prefer to pay with purchase orders, not credit cards.

The Honeywell team knew they had to do better.



**“The encrypted digital trail cuts the need for paperwork and makes it quick and easy to check the certification of a part. A blockchain-based marketplace removes uncertainty from the transaction.”**

— Samuel Engel, Senior VP and head of the aviation group,  
*ICF International Inc.*

Enter the blockchain, which *The Economist* famously called “a machine for creating trust.”

A decentralized network of computers maintaining an immutable ledger enables people with no particular trust in one another to buy and sell with peace of mind.

“The encrypted digital trail cuts the need for paperwork and makes it quick and easy to check the certification and origin of a part,” says Samuel Engel, senior vice president and head of the aviation group at consulting firm ICF International Inc. Among the services ICF provides is certifying aircraft parts for clients.

“A blockchain-based marketplace removes uncertainty from the transaction,” he says.

Thanks to the blockchain records, buyers can now view vital data on many parts, such as:

- The entire lifecycle of a part
- The number of hours it was in service
- Any and all repairs made and by who, when and where
- All previous owners of the part



## Choosing an effective blockchain framework

To build their marketplace, Honeywell experimented with Ethereum. But in the end they chose Hyperledger Fabric for their blockchain platform.

Honeywell Aerospace's Chief Digital and Information Officer Sathish Muthukrishnan was with American Express, a founding member of the Hyperledger community. The company has used Hyperledger for several projects, including a more flexible members rewards system.

For several years, Muthukrishnan has watched Hyperledger Fabric evolve. He appreciated the pace of its innovation and the quality of its code, much of it contributed by IBM.

Among the critical factors Honeywell needed were low latency, high throughput, and fast send rates. Hyperledger Fabric provided all that, along with privacy controls such as channels that give a granular ability to manage data.

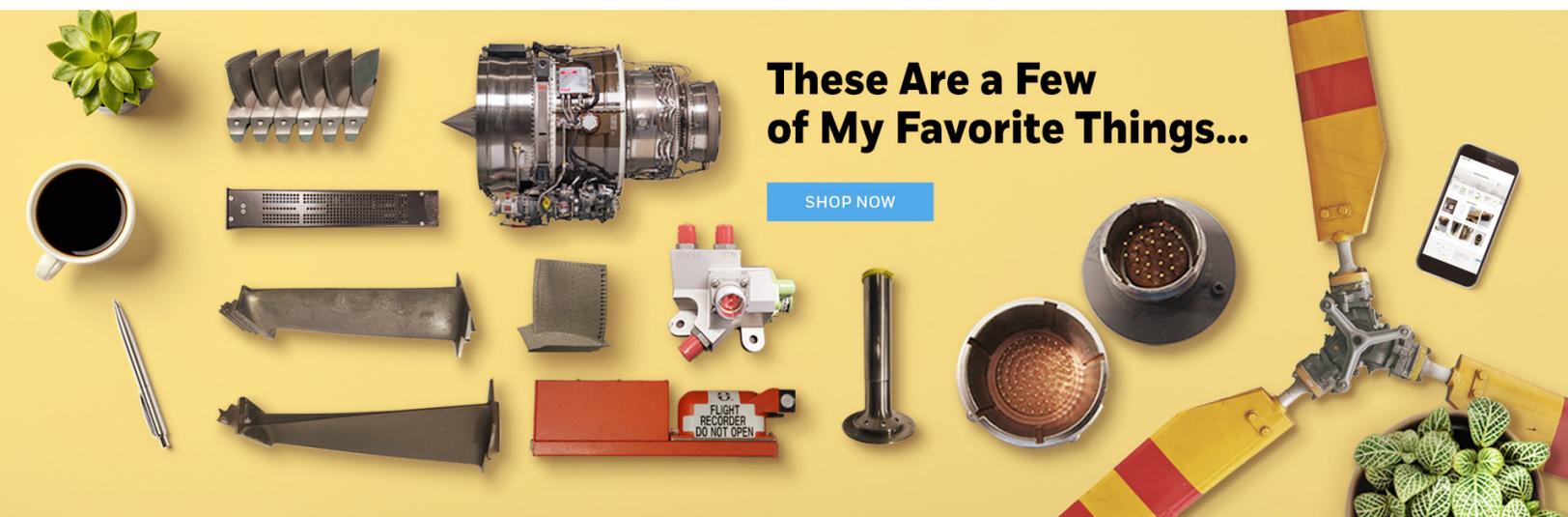
Muthukrishnan appreciates the support from the Hyperledger open-source community, where many members are grappling with supply-chain issues similar to those at Honeywell Aerospace.

That said, he emphasizes that GoDirect Trade is platform-agnostic. If another blockchain framework appears in the future that can handle the job better, Honeywell is not locked into Hyperledger.

With Hyperledger Fabric as the blockchain foundation, Honeywell developed a middleware layer on top of it. And the marketplace apps are designed to work with major other blockchains such as Ethereum or R3's Corda.

"You can't force everyone else to adopt your particular solution," says Muthukrishnan.

The network currently includes five validating nodes running Hyperledger Fabric version 1.4 deployed on Honeywell enterprise cloud and other commercial clouds. To preserve data security, the system uses channels and private data collections.



# Setting high standards that encourage quick adoption

Called GoDirect Trade, the new marketplace went live in only eight weeks as an MVP (Minimum Viable Product) in December 2018.

The platform set high standards for sellers. For example, every listing required images, a price, and as much documented history on the part as possible.

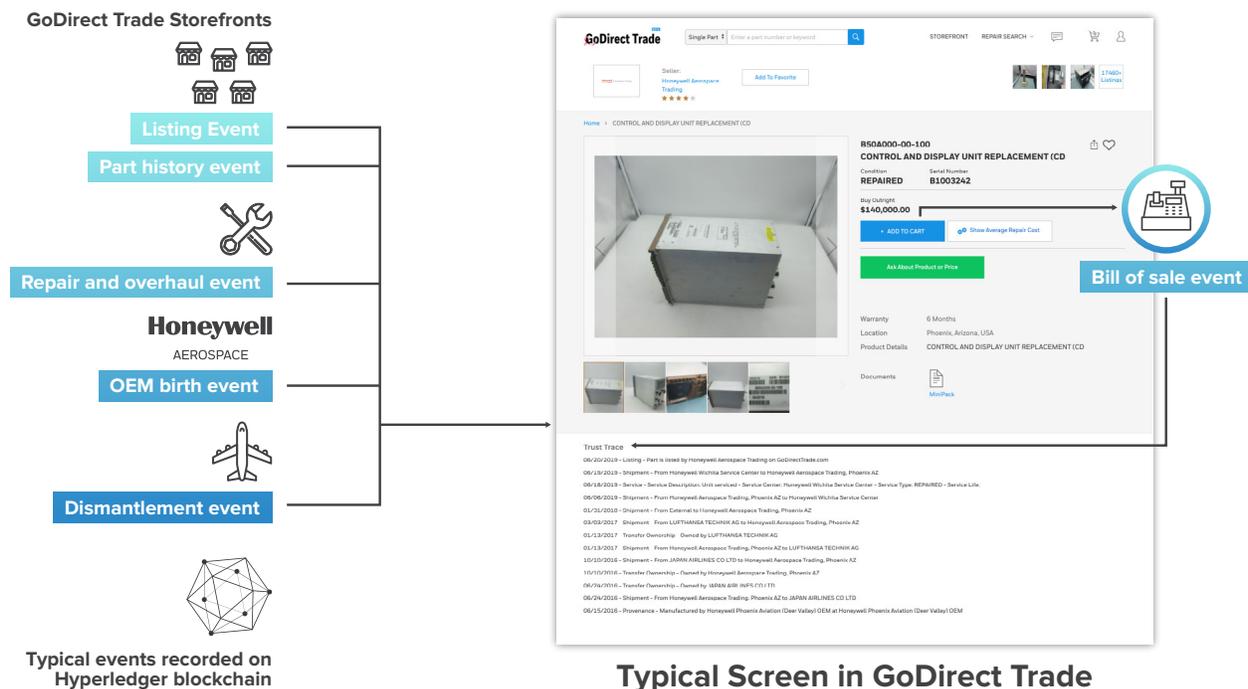
In return, the marketplace promised key benefits. A seller could launch a digital storefront in a matter of minutes, using a flexible out-of-box e-commerce platform.

Today, shopping on the platform feels like using a typical consumer e-commerce site with photos, detailed product information, and a simple checkout. The average checkout screen only takes two clicks. All these were groundbreaking innovations for aviation parts.



**“We make it easy to have a fluid back-and-forth conversation between the buyer and seller. We really wanted to take the B2B space and fit it into the B2C mold, with an easy consumer-type checkout.”**

— Lisa Butters, General Manager, GoDirect Trade, Honeywell Aerospace



The online marketplace filled a pressing need.

A month after GoDirect Trade went live with little fanfare, the marketplace had registered more than 300 buyers and processed nearly a quarter million dollars in online transactions. Within 10 weeks, sales soared past \$1 million.

Before the marketplace was a year old, it had passed \$4 million in sales and captured almost a third of the potential user base with almost 5,000 registered users. Every month it broke records for signups of new users and sellers.

**The online marketplace filled a pressing need. In 10 weeks, sales soared past \$1 million. Before it was a year old, GoDirect Trade had passed \$4 million in sales, registered almost 5,000 users, and included more than 50 storefronts for sellers.**

Over 50 storefronts have launched on the marketplace. Half of all transactions are with new customers a seller has never done business with before. Shoppers include some of the largest airlines in the world.

And just three months after it went live, a customer with a Gmail account dropped a \$100,000 used jet engine into their cart and checked out.

“If that’s not a signal that the shift to a digital experience is coming, I don’t know what is,” says Butters.

## Providing a stream of new benefits

When most aircraft come to the end of their lifespans, they’re dismantled to recover any good parts. About 1,000 parts can be harvested from a typical plane.

Each part must be removed, cleaned, tagged, re-certified or repaired, with all the accompanying paperwork. Then all these parts must be listed for sale—a process which often leaves them sitting unsold in a warehouse for a long time.

All in all, dismantling an aircraft is a tedious, costly process that can take up to 10 weeks. But the Honeywell system may cut the time in half.

With GoDirect Trade, dismantlers can now take a photo of a part as soon as it’s removed. Then the system can generate an as-removed quality tag and immediately record that part on the blockchain. With this new process, any dismantled aircraft part can be listed on the store within minutes.



And if a part is no longer usable, its “retired” status becomes a permanent record on the blockchain, which prevents it—or some counterfeit part given its number—from ever being used in the future.

Speaking of the future, Honeywell is now working on a mobile app for the marketplace.

And within 10 years, Butters envisions the marketplace encompassing “anything and everything aerospace” including apps, technical manuals, new parts, even entire aircraft.

## The sky’s the limit for blockchain in aerospace

Some added benefits the marketplace may deliver are better analytics for parts-related business decisions, less siloed information, and fast and easier aircraft leasing.

Like any marketplace, Go-Direct Trade will accumulate a lot of data. That data could be used to generate more powerful analytics that support better business decisions about pricing or retiring different parts.

The blockchain may help free data that’s now locked up in many different file formats.

“We’re trying to design the blockchain to take all the physical documents, digitize them, and then catalog them in a consistent standard across the industry,” says Butters. “So if an enterprise wants to make a query, for example, for all the 8130 tags [for airworthiness] from all their aircraft, the system won’t shoot back 30,000 PDFs for them to sift through.”



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The blockchain could even dramatically change aircraft parts traceability.

Within aerospace, customers are asking for better safeguards against counterfeit parts at all levels of the bill of material. On top of that, regulations are changing to demand even more stringent control.



Honeywell has successfully completed trials to “mark” aerospace parts using a two-factor authentication process, similar to the American \$100 bill.

This will pave the way to more robust digital traceability through a part’s lifecycle and enable companies to police their brands better.

Blockchain by itself cannot combat the temptation to sell uncertified or even counterfeit parts. But linking a physical asset to its digital pedigree is certainly a step in the right direction.

As air traffic continues to grow, several recent reports have shown that airlines, airports, and aviation authorities are intensely exploring the potential of blockchain. Just as it has with GoDirect Trade, the technology promises to streamline old-fashioned processes, improve the customer experience, and save time and money.

Some likely uses for blockchain in the industry include:

- Better booking and baggage tracking
- Credentialing for pilot training
- Purchasing tickets
- Recording aircraft maintenance updates
- Sharing loyalty points between airlines, especially smaller, local providers
- Sharing information between airports



## About GoTrade

GoDirect Trade is a digital marketplace that brings buyers and sellers in the aerospace industry together to simplify their experience of buying and selling aerospace parts.



## About Hyperledger

Hyperledger is an open source collaborative effort created to advance cross-industry blockchain technologies. It is a global collaboration including leaders in finance, banking, Internet of Things, supply chains, manufacturing and technology. The Linux Foundation hosts Hyperledger under the foundation. To learn more, visit <https://www.hyperledger.org/>

