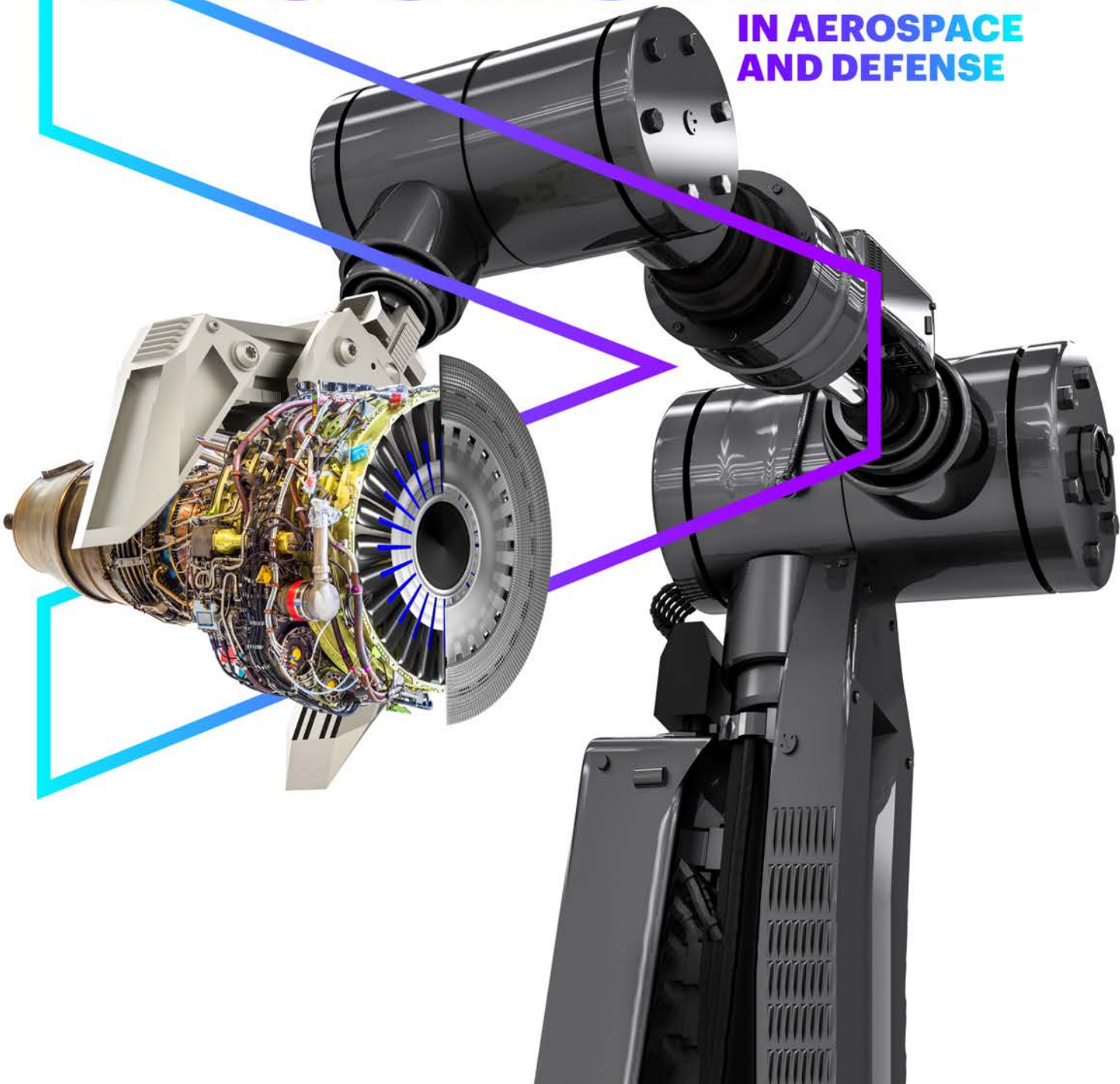
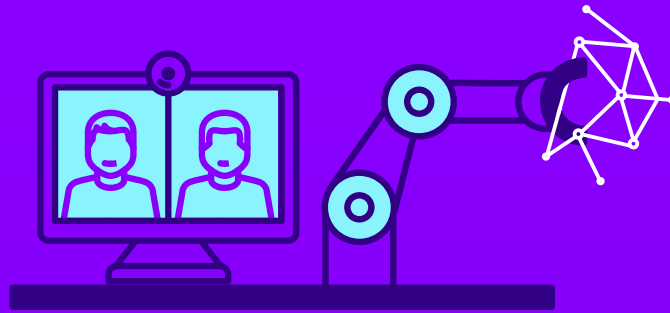


**CAPTURING GROWTH
AND EFFICIENCY
THROUGH A RAPIDLY
EMERGING TECHNOLOGY**

BLOCKCHAIN

**IN AEROSPACE
AND DEFENSE**





MULTI-ECHELON SUPPLY CHAIN VISIBILITY.

CONFIGURATION MANAGEMENT.

QUALITY.

AUTHENTICATING SUPPLY.

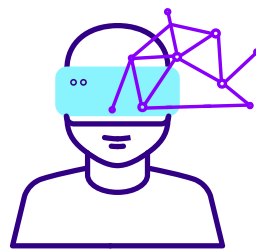
CERTIFICATION OF PEOPLE AND MACHINES.

SOFTWARE LIFECYCLE MANAGEMENT.

These are a very few of the challenges that aerospace and defense companies are addressing in an industry naturally characterized by complex products, deep supply chains, and a decades-long aftermarket with multiple, often shifting, participants. Significant investment, effort, and technology have yielded great progress in these areas, but the need for continued industry growth and efficiency demands more. **As aerospace and defense companies invest in digital technologies to support these goals, one emerging technology is gaining attention: BLOCKCHAIN.**



Aerospace and defense executives surveyed by Accenture cite blockchain as one of the top emerging technologies they are focused on to support greater industry growth and efficiency¹. At its core, Blockchain is an immutable transactional record that maintains and records data in a way that allows multiple stakeholders to share access to the same data and information confidently and securely.

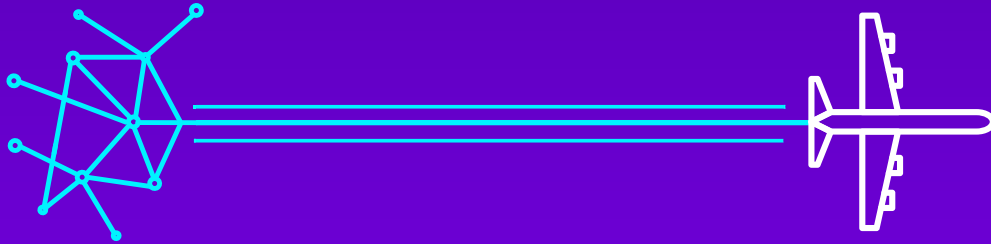


But how has a technology popularized through virtual crypto-currencies gained attention in aerospace and defense, a very real-world industry?

Blockchain's origins in facilitating accurate, auditable, and secure record keeping across a group of dispersed investors translates well to aerospace and defense, an industry with multiple participants, that requires reliable and auditable records, and highly values security. While blockchain technology and standards are still maturing, aerospace and defense companies have a unique opportunity to prove the business value of blockchain systematically and set its place alongside other technologies in their digital strategies. The opportunity is directly tied to the structure of the aerospace and defense industry.

¹ Accenture 2017 Industry X.O Research, Lead in the New






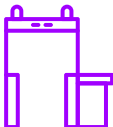
WHY BLOCKCHAIN?



From ERP, to PLM, to custom solutions, aerospace and defense companies already use a variety of technologies targeted at addressing operational and product complexity. These investments have helped them improve visibility and efficiency within their organizations and between major supply chain partners. Yet aerospace and defense companies' challenges in managing their extended enterprises beyond tier one suppliers, to introduce and deliver on new value-added services in the aftermarket, and to do so while simultaneously managing costs, has tested existing technologies. Blockchain offers aerospace and defense companies an intriguing value proposition to augment existing technology investments.

While blockchain's general characteristics align with many of the ongoing needs of the aerospace and defense industry, it should not be implemented for implementation's sake.

Like any new technology, it must be proven to deliver value for an individual business.

BLOCKCHAIN CHARACTERISTIC	WHAT IT MEANS	AEROSPACE & DEFENSE VALUE
IMMUTABILITY 	<ul style="list-style-type: none"> • Data cannot be altered without knowledge of all stakeholders • Single source of truth across all nodes 	Track and audit transactions across multiple supply chain and operational partners
AUTOMATION 	<ul style="list-style-type: none"> • Network self-validates all ledger entries • Business rule automation • Near-real-time processing 	Increase efficiency and drive program affordability
COST EFFECTIVENESS 	<ul style="list-style-type: none"> • Elimination of intermediary costs • Reduction in operational costs related to exceptions and reconciliation 	Increase capability without replacing existing technology investments
AUDITABILITY 	<ul style="list-style-type: none"> • Real time track and trace audit trail • Improve business, operational, and regulatory reporting 	Improve quality and delivery
DECENTRALIZATION 	<ul style="list-style-type: none"> • Assets controlled by their owners rather than institutional custodians • Information validated with consensus mechanism instead of a third party 	Increase visibility across full supply chain and aftermarket
SECURITY 	<ul style="list-style-type: none"> • Public-key encryption provides record-level security of data • No single point of failure—network is resilient against attacks on individual nodes 	Extend data security and certification outside entire extended enterprise

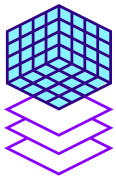
USE CASES

IN AEROSPACE AND DEFENSE

Blockchain, like many new technologies, is full of promise but is still unproven in large scale deployments. As aerospace and defense companies begin to explore that promise, they should do so with a firm focus on identifying use cases that accomplish two objectives:



Demonstrating that blockchain can deliver business value and



Demonstrating the role that blockchain can play within an overall digital technology architecture.

As aerospace and defense companies begin to identify which use cases make sense for their businesses, there is a series of questions that they can ask about their target process to understand if it has the right characteristics to gain value from blockchain (See Sidebar on page 6).

Aerospace and defense organizations should explore blockchain's applicability based upon specific goals, growth objectives and its ability to unlock trapped value. But Accenture has identified a wide range of blockchain opportunities that extend across multiple industries that may provide a jumping off point. Some of these "common" blockchain use cases, such as payment processing and financial reconciliation, are applicable to aerospace and defense.

There are, however, more specific use cases that merit **deeper investigation** from aerospace and defense companies.

FIGURE 1 Potential Blockchain Use Case Areas for Aerospace and Defense

* Examples are non-exhaustive.

USE CASE AREA	HIGH LEVEL CHALLENGE	HOW BLOCKCHAIN CAN HELP
MULTI-ECHELON SUPPLY CHAIN MANAGEMENT	How to manage supply chain visibility and orchestration across all tiers of the supply chain	<ul style="list-style-type: none"> • Improve the accuracy of multi-echelon track and trace • Improve coordination between supply chain partners
MANAGEMENT OF CONFIGURATION—DESIGN, BUILD SERVICE	How to create a digital thread that captures asset configuration from initial design through in-service	<ul style="list-style-type: none"> • Improve engineering-manufacturing integration • Improve asset availability • Improve service contract profitability
CERTIFICATION OF PEOPLE, PARTNERS, PARTS	How to ensure that workers, partners, and parts are certified to be used	<ul style="list-style-type: none"> • Improve product and process quality • Improve regulatory compliance • Increase accuracy of service history
IDENTITY OF THINGS	How to secure the identity of internet of things data sources	<ul style="list-style-type: none"> • Improve IoT security • Improve IoT insights
ENTITLEMENTS AND RIGHTS FOR SOFTWARE, SERVICES, AND WARRANTY	How to confirm that employees, partners, and customers have the right of use for software, services, and warranty	<ul style="list-style-type: none"> • Reduce revenue leakage • Improve asset performance
ACCESS TO “PUBLICATIONS” AND DATA	How to provide distributed digital rights management for technical “publications” and engineering data	<ul style="list-style-type: none"> • Improve technical data security • Improve ability to deliver data services



Aerospace and defense companies are already moving forward in several of these areas. In examples such as tracking which individuals are certified to perform complex tasks, to understanding the authenticity of items in the supply chain, to combining blockchain identify with IoT devices, aerospace and defense companies are targeting specific proofs of concept to get started with blockchain.



GETTING STARTED

WITH BLOCKCHAIN

Choosing an initial use case to demonstrate the technology and its business value is only one piece of the blockchain journey.

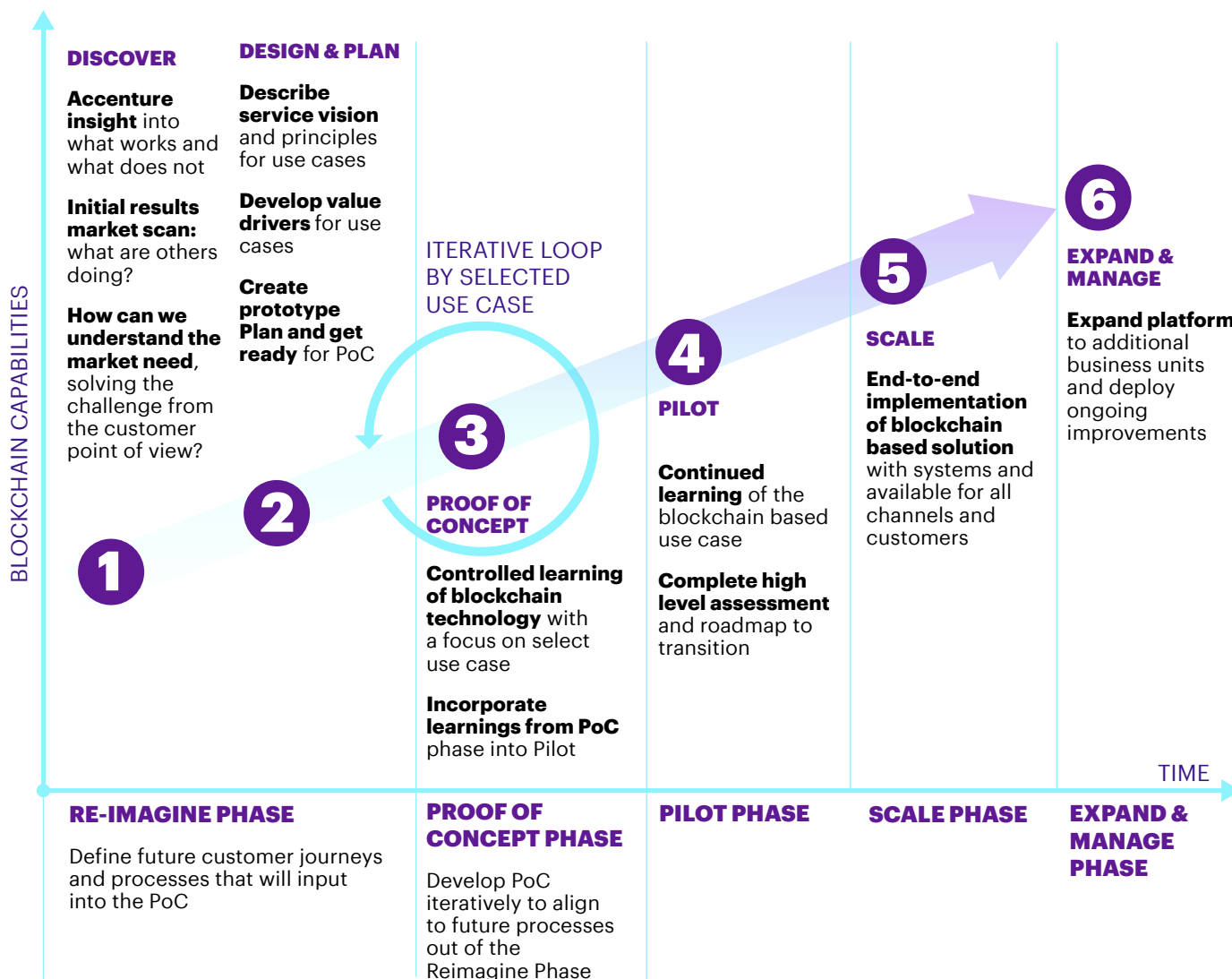
Aerospace and defense companies should embark on a structured journey that aligns the business value, technology journey, and ecosystem change that blockchain can bring. Should a use case deliver the expected business benefits, this kind of approach allows an organization to both scale the capability and build organizational confidence.

Accenture has identified six steps toward the industrialization of blockchain. Beginning with the discovery of use cases and potential value, the journey should quickly move into the agile development of proofs of concept to test the business value and the viability of blockchain for those use cases. Ultimately, the objective is to scale validated proofs of concept into an element of a comprehensive and secure digital architecture.



The blockchain journey will necessarily engage internal business and technology constituencies. Business constituencies will need to engage in defining the way forward for standards and data management. Technology leaders will need to define blockchain's place in emerging digital and security architectures. Yet because blockchain's value is largely derived from its ability to manage data across a distributed network, the journey is in many ways less about the technology than it is about building the community that will participate in the blockchain ecosystem, and about the rules and standards that will govern that participation. One way in which Accenture has worked with the industry to envision the potential value of blockchain and its associated ecosystems is through an interactive game that can be found on www.accenture.com/blockchainaero.

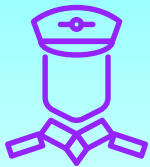
FIGURE 2 The Blockchain Journey



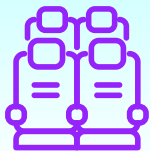
EXPLORING

BLOCKCHAIN USE CASES

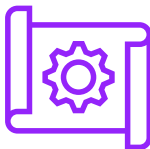
The use of a blockchain network makes sense in the following situations:



MULTIPLE VALIDATION AND CONTROL POINTS: Blockchains provide strong process step and data element controls, and capture immutable data, which supports network control and auditability.



MULTIPLE ACTORS: They offer enhanced coordination and “choreography” among network actors by providing a mutualized view of a transaction’s latest status, obligations and information.



RECONCILIATION: Blockchains can provide “golden” sources of mutualized data – the purest, most validated and complete information possible – compared to traditional ledgers, which typically consist of dissimilar data stores that require constant alignment and reconciliation.



DATA QUALITY AND LINEAGE: These networks provide data element-level controls for data that multiple actors continuously update and maintain.



AUDITABILITY: Blockchains make possible a reliable and accurate audit trail that provides a tamper-evident data store and offers transparency in the form of a valid identity for each data change.

MOVING FORWARD

Blockchain is designed to provide highly secure, auditable, and traceable data records across a distributed population. The aerospace and defense industry is a geographically distributed supply chain that serves an equally distributed set of operators, all of whom value data traceability, auditability, and security. While blockchain and aerospace and defense may appear to be a natural match to the industry, aerospace and defense companies should consider four principles as they begin their blockchain journeys.



1. Blockchain is real, but is still maturing. **Now is the time to learn and prepare.**
2. Blockchain is like any other technology investment. **The business case comes first.**
3. **Blockchain is a component** of an overall digital transformation, **not the transformation itself.**
4. **Adoption of blockchain will hinge** not just on the technology, but **on the ecosystems of participants that use it.**

A structured approach designed to demonstrate business value through rapid proofs of concept can help aerospace and defense companies align to these principles and identify how blockchain can scale to support continued industry growth and efficiency.



**FROM FINANCE, TO SUPPLY CHAIN,
TO CONFIGURATION MANAGEMENT AND
THE IDENTITY OF THINGS, BLOCKCHAIN IS
POISED TO HELP AEROSPACE AND DEFENSE
COMPANIES**

**LEAD IN
THE NEW.**

AUTHORS

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Accenture is a leading global professional services company, providing a broad range of services and solutions in strategy, consulting, digital, technology and operations. Combining leading experience and specialized skills across more than 40 industries and all business functions—underpinned by the one of the world’s largest delivery network—Accenture works at the intersection of business and technology to help clients improve their performance and create sustainable value for their stakeholders. With approximately 411,000 people serving clients in more than 120 countries, Accenture drives innovation to improve the way the world works and lives. Visit us at www.accenture.com.