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BLOCKCHAIN IN SPACE INDUSTRY

Abstract

Since the dawn of mankind, humans have been looking up at the dark skies, having millions of questions across billions of light years. To answer some of these questions, humans adventured out in the space unknown and unaware of how deep the rabbit hole goes. On this exploratory journey, this paper presents how Blockchain can facilitate the space industry to be future ready for the exciting risks in the vast darkness of the universe. As we endeavor into Space, we have the opportunity to create a decentralized, transparent, and trustful ecology; a better version of what we have achieved here on Earth. Our research focuses on how to inculcate these three aspects in the fiber of Space Industry as a whole. Blockchain can democratize the Space Industry where big as well as small companies can participate. The paper describes how blockchain can establish a (1) Universal Space Economy, improve the (2) Management of end-to-end Supply Chain, enhance (3) IOT Manufacturing Operations, and provide a platform for (4) Registry and Management of Space Assets using Smart Contracts and Distributed Ledger capabilities with real-time access to Data Changes. The paper focuses on some potential use cases and applications of blockchain in aforementioned areas particularly in the Supply Chain and CyberManufacturing in space industry. The use cases and applications are a result of extensive research on the potential role, capability and value of blockchain within space industry. It demonstrates the use of distributed ledger, blockchain and smart contracts in creating an ecosystem of trust. The paper explains the information flow in the overall ecosystem and the type of stakeholders involved in business operations. It also explains how this ecosystem can be more secure and how adoption of blockchain technology will aid in addressing the technological and operational gaps for future space missions. The paper presents how all the industry stakeholders can be benefited in the blockchain enabled ecosystem. Stakeholders will be able to track and trace the equipment/part performance through IOT enablement during assembly and at run-time. Paper also introduces the concept of Blockchain-of-Blockchain in the Supply Chain. With the advent of new space era, where private players are actively participating in the Space-Race, it is now more than ever important to embrace upcoming technologies. Technology has helped us to send Man Machine into the universe. We as humans will always look up at the zenith wondering what lies beyond.