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Author: Mr. Marcelo Boldt  
DLR (German Aerospace Center), Germany, marcelo.boldt@spacegeneration.org

Mr. Swarnajyoti Mukherjee  
Apogeo Space Srl, Italy, s.mukherjee@apogeo.space

ADOPTION OF DISTRIBUTED LEDGER TECHNOLOGY (DLT) IN THE SUSTAINABLE SPACE  
INDUSTRY: FINANCE, LEGAL, SECURITY & LOGISTICS

**Abstract**

Blockchain or as the general term, decentralized distributed ledger technology (DLT), defined by cryptographic hashing gained enough traction and became a shared, trusted, and public database of all transactions in a network. As a result, it can offer, together with non-fungible tokens (NFTs), full-history traceability, deep liquidity, and convenient interoperability. In recent years, these technologies have found many applications and impacted many industries on earth. Elements such as smart contracts and tokenization have been used by many industries such as entertainment, real estate, and supply chain. As a consequence, the potential applications of blockchain for the space industry and space-related assets are rapidly growing.

A wide range of space assets such as satellites, spacecraft, space debris, orbits, and asteroids, can be tokenized as digital tokens and manipulated by blockchain technology. Converting space assets into digital tokens and handling them using blockchain protocols and smart contracts will add more transactions with space resources from any place in the world. Furthermore, satellites can be used to receive, store and broadcast blockchain data and apps. Hence, satellite networks could be the infrastructure where data can be stored and through which transactions can be performed. In the space mission life cycle to tracking data relay satellite system, tokenization of orbital data assets to Earth Observation image, blockchain can be used in wide varieties of user-based request patterns which eventually can lead all space transactions and communications in a transparent, verifiable, and secure manner.

This paper aims to investigate adopting blockchain theory in the space industry and its relevant applications and describes the potential for a gradual adoption trend over the next decades. A new conceptual blockchain framework for proposing new models that can be used as theoretical solutions to some major challenges in the space industry has been introduced here. This paper also exhibits the attempts to conceptually investigate the adoption of blockchain theory in space technology based on the space digital token from technical aspects to financial, legal, security, and logistical framework.