Paper ID: 62565
student

54th IAA SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE ACTIVITIES (D5)
Cybersecurity in space systems, risks and countermeasures (4)

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SECURING SATELLITE DATA WITH ETHEREUM BLOCK-CHAIN TECHNOLOGY

Abstract

With the advent of the new space era, an increasing number of satellites are being launched for varied purposes such as technology development, navigation, earth observation etc. Though many technologically advanced satellites are launched, the security of the data shared via various links voices concerns mainly related to cyber-attacks as it is uses long-range telemetry networks to reach the ground which runs on open telecom network protocols and has a single-point access model-type communications. Using Ethereum Block-chain Technology or distributed ledger provides a decentralized, immutable, secure and transparent way of space transactions i.e. data-sharing between satellites and with the ground stations. Space resources like satellites and their orbits, spacecrafts , celestial objects , orbital debris are fabricated as crypto-tokens that are monitored and tracked using smart-contracts in a block-chain network whose data are cryptographically hashed and are generated as blocks into a Peer-Peer network that are accessed only by the person who has the private key for the block thus making it impenetrable to any cyber-attack. The data that is entered into the distributed ledger cannot be tampered with as they are processed using complex block-chain algorithms (Consensus algorithms) which ensures proper security at all stages of satellite communications. This paper aims at extensively researching Ethereum blockchain technology and proposing ways of incorporating the same into satellite communication systems to render it secure. It also summarizes the Space-chain's implementation of the block-chain technology based satellite-systems as a way of securing satellite data communications.