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ACTIUM

A Decentralized Vessel Maintenance System

A Dissertation by

Mr. Dinu Senal Sendanayake

(W1742312 / 2018445)

Supervised by

Mr. Sriyan Fernando

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ABSTRACT

Vessel maintenance is the most crucial procedure for the seaworthiness of the vessel. If the vessel integrity is damaged, it can cause a crisis for crew members, port authority, ship company, and the overall maritime ecosystem. While various sectors can affect the vessel's integrity, there is one primary factor that can deteriorate the vessel's durability, and it is not having a proper maintenance record. Ships' maintenance records are usually integrated using analog methods such as pen and paper. These incompetent procedures cause a terrible impact on seaworthiness because these existing systems are vulnerable to tamper, destroy, or be lost. Most maintenance systems are controlled by one party and can't trace specific maintenance processes due to tampering, making auditing hard and inconvenient. These all issues accumulate and deteriorate the vessel's seaworthiness and decrease the shipping company's reputation.

Decentralized systems are used to convey the authority of a single entity of a system to multiple entities. This technique can also use for vessel maintenance records. Since a single party controls the maintenance record system, giving authority to multiple parties can increase the integrity of the record data.

The project ACTIUM is a novel system integrated on the solana blockchain that overcomes the tampering issue of the maintenance record. The traceability of the maintenance record also intensifies because of the integrity of the data. Integrating the project with novel use case empower blockchain technology and its scalability.

Keywords*: Blockchain, Decentralization, Cryptocurrency, Solana, Anchor Framework, System Security, Vessel Maintenance Records, Vessel Parts Supply Chain, Maritime Sector.*