

IAF SYMPOSIUM ON SPACE SECURITY (E9)

Cyber-security threats to space missions and countermeasures to address them (2.D5.4)

Author: Dr. Michele Iacobellis
Planetek Italia, ItalyDr. Angelo Amodio
Planetek Italia, Italy
Dr. Daniela Drimaco
Planetek Italia, Italy

CRYPTO TRADEABLE EARTH OBSERVATION (CTEO)

Abstract

The EO market is in a rapid expansion and, more and more, EO derived products and services will be part of value chains different from their original ones. It means that each single step of the EO services value chain could be part of, and integrated into different market sectors. The more it happens, the more EO market needs to improve its maturity. Some fundamental steps towards the maturity are represented by the authenticity of the managed information and data, and the integrity of each processing step applied to them, from their acquisition to their delivery to the customer or to the Service Provider. In fact, from the first appearance of the EO satellite data inside an archive under a Cyber Attack, the satellite data can be not only stolen, but also, and even worst, be substituted by fake copies that can invalidate all the information to be extracted from them for all the customers and the EO service providers. That, of course, can occur in each processing step of the value chain. The problems aforementioned can be addressed in different ways, but a technology like the “Blockchain” seemed the best fitting solution to that. Moreover, from a technical point of view, the blockchain is a database relying on three fundamental concepts: Peer-to-peer networks, Public-key cryptography, Distributed consensus. By exploiting those characteristics, the EO market could go out its protected shell and be integrated inside more complex and complete refactored value chains without the need of setting up redundant intermediation or overpowered centralized trusted authorities. In fact, in the context of the blockchain, data can be anything relevant or irrelevant, but most interesting use cases concern information that currently require a trusted over-redundant third-party to exchange. In this context ESA awarded to Planetek the CTEO project, in which we designed a thin application layer (a library) that allows any client application (a piece of software that uses the library) to participate to a peer-to-peer network with the aim of exchanging specific EO content by using dedicated smart contracts and exchanging signatures on EO imagery. The EO content is represented by any data related to Earth Observation activities, be the data the original satellite produced imagery, any value-added product (VAP), specific product metrics and metadata.