



ASSEMBLY — 40TH SESSION

TECHNICAL COMMISSION

Agenda Item 30: Other issues to be considered by the Technical Commission

USE OF BLOCKCHAIN TECHNOLOGY AS A REGULATORY TOOL

(Presented by Brazil)

EXECUTIVE SUMMARY

During the past 10 years we have seen the rise of blockchain as a reliable technology for data transactions, having as its main characteristics the traceability and the immutability of the registries. At the same time, the use of digital data as a way of storage has become a standard between air carriers. This paper shows how the Brazilian authority is using blockchain as a tool for electronic signature and electronic record keeping in lieu of standard certification.

<i>Strategic Objectives:</i>	This working paper relates to Strategic Objectives of Safety and Economic Development or Air Transport.
<i>Financial implications:</i>	Not applicable
<i>References:</i>	Not applicable

1. INTRODUCTION

Blockchain Technology

1.1 First used in bitcoins in the late 2000's, blockchain is a technology based on decentralized, distributed and public record keeping. Each new information added to the network is encrypted and receives a hash based in previous information, which will then be shared with all the participants. So, all the network participants can audit transactions independently, making it very difficult to change previously registered information.

1.2 The genesis data block of the network contains the rules by which the network will work, so new information can only be entered if it obeys its premises. The network can either be public or private, the main difference being that new users must be invited and identified to join it in the private one.

1.3 Being a decentralized network, there is no need to run blockchain in a central database, so there is no unavailability. This ensures, as well, that the creator of the network does not need to be "online", or even participate of the network for its continuous operation.

Electronic Signatures and Electronic Record Keeping

1.4 The use of electronic signatures and record keeping is nowadays usual in aviation, but it can only be used as the main source of information if it obeys to a series of regulatory requirements, as software certification. Digital systems can be used by the community, but an approval is necessary to ensure, among other issues, robustness and immutability.

1.5 The process implies costs and interchangeability is jeopardized. Blockchain was not yet a viable solution because it had to comply with the same requirements as the software certification.

2. DISCUSSION

2.1 In 2018, ANAC launched a pilot project using blockchain technology to create an environment in which the aviation community can store data in a safe and reliable manner. A blockchain network containing information of data flight logs was created. There are few requirements to join it, as the information is stored in a decentralized and audited network and it must comply with the rules embedded by the aviation authority.

2.2 ANAC has used a private network methodology, in which the participants are identified at the log-in process, but from this point on the system works by itself. This ensures that each one can access and store private data in a public database, certified and immutable, and this information can be traced to its source and shared or exchanged between participants without direct action by the Authority.

2.3 The concept in test is: a civil aviation authority can improve relations between parties, using a technology recognized by its security characteristics, providing a way for the industry to comply with regulation without undergoing complex certification processes. Thus, it is not a mandatory system for the aviation community, but an alternative that is available to those that choose to use it and that can promote numerous benefits.

2.4 Flight logbooks were chosen as the pilot project because it is a core information common and useful to many players: records are often interchanged for maintenance purposes or even for aircraft sale or shared uses. These encrypted, but still public, records cause transaction costs shrinkage while improving data security, which allows safety levels increase as well.

2.5 The blockchain network can promote collateral benefits as well, improving trust for third parties as insurance companies who can rely on traceable information for risk management. It can also provide critical mass of information for the authority, or others, through open data technology, for advanced analysis and further regulation propositions, always enforcing privacy protection issues.

2.6 Other advantages of using of blockchain can come with the use of this kind of technology for record keeping. Being the logbooks essential information for pilot training and aircraft maintenance, the use of a public network to store core information, accessible by the authority, and assuredly to be immutable and virtually indestructible, may provide an environment where aviation personnel and continuous airworthiness certification would be only an automatic consequence of network use.

2.7 This initiative is a proof of concept, finding and solving issues that will allow more intense usage of blockchain technology, as smart contracts, to not only embed regulation but also to make actions as licensing, aircraft propriety and other applications self-executable.

3. CONCLUSION

3.1 The use of blockchain as a day to day tool is proving to be useful for regulation enforcement, transaction costs reduction and data security, promoting therefore safety in civil aviation. There is still a long path to follow until full implementation of this solution, but early results show that Authority's provision of genesis blocks for public usage can be a standard solution for future regulation.

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