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DIGITALISING SEAFARERS' CERTIFICATES

Navigating towards e-certifications

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Transforming Maritime, Ahead of Time

Introduction

Navigating towards electronic certification…

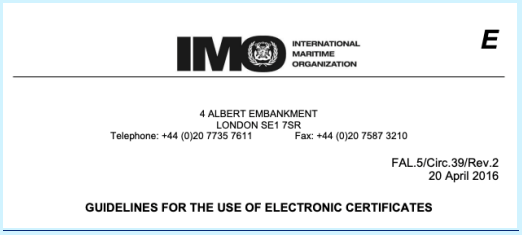
This whitepaper explores how blockchain technology is being leveraged to facilitate maritime e-certifications, and showcases early adopter experiences from around the world.

Seafarers are the lifeblood of the global economy, facilitating the transport of over 80%[1] of the goods that we commonly use. In order to work aboard ocean-going vessels, seafarers must possess valid certificates that comply with the International Maritime Organization (IMO)'s Standards of Training, Certification and Watchkeeping (STCW)[2]. These certificates serve as evidence of competency and are used by many parties such as crewing agencies, ship owners/managers/operators, and Flag States.

Although the IMO encourages the use of electronic certificates (e-certificates) since 2016, with the publication of the *FAL Guidelines for the Use of E-certificates*[3], the change from paper to electronic certificates has been slow. To date, the majority of 1.89 million seafarers[4] carry traditional paper certificates on board despite the obvious inconveniences.

The examples given in this whitepaper highlight how the use of e-certificates for seafarers' certifications reduces the administrative burden, increases safety, eliminates the risk of fraud and enhances the reputation of a sector that has always been labelled as 'traditional'.

IMO GUIDELINES FOR E-CERTIFICATES


IMO INTERNATIONAL MARITIME ORGANIZATION

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FAL.5/Circ.39/Rev.2
20 April 2016

GUIDELINES FOR THE USE OF ELECTRONIC CERTIFICATES

IMO's FAL.5/Circ.39/Rev.2[3] of 2016, encourages the global maritime industry to move away from traditional paper certificates to reduce the administrative burden on Administrations, Port State Control officials, ships' crew and other stakeholders.

This whitepaper showcases the experience of Hochschule Bremen and other prestigious organisations, as they embark on a voyage of digital transformation, moving away from traditional paper-based certification processes to blockchain-enabled electronic certifications.

1 Review of Maritime Transport 2022.
2 International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).
3 IMO Guidelines for the Use of Electronic Certificates.

The Problem

Traditional pain points

Maritime certificate issuers (i.e. Flag States and Maritime Training Institutions) and the certificate receivers (primarily the seafarers) suffer the brunt of the pain due to the paper-based certificate processes. The main pain points experienced are:

Document Security:

Centralised data is vulnerable to hackers more easily than distributed networks. On the other side, paper certificates are vulnerable to loss, damage, misplacement, forgery, and theft, with the risks further heightened when carrying these documents on ships around the world.

Resource Inefficiencies:

Conventional certification processes are costly due to the extended processing time and resources required for seafarers to receive their certificates. The preparation and couriering of physical documents contribute to these costs and have an adverse environmental impact.

Fraud Risk:

Fraud is present globally, impacting individuals and nations' reputations[5,6,7]. Paper certificates facilitate the proliferation of fraud, as it is difficult to validate their authenticity in real time.

Process Inefficiencies:

The COVID-19 pandemic caused processing delays for paper certificates as issuers worked from home, exposing the traditional certification process's lack of resilience to sudden disruptions. Issuing, revoking, or archiving certificates is a challenge, especially for issuers processing a large volume of certificates.

Lack of Visibility:

Paper certificates make it virtually impossible for issuers to have easy access to metrics for better decision-making, audits and control. Digitalisation enables real-time visualization and traceability of data.

The challenges around traditional paper certification processes are related to document security and fraud risk, slow processing speed, high admin costs and avoidable carbon footprint.

5 Ukraine informs the International Maritime Organization (IMO) about fraudulent certificates issued to seafarers.

6 Fraudulent Seafarer Certification in India.
7 IMO Tracking of Fraudulent Certificates.

Case Study: Hoschshule Bremen (HSB)

Pioneering digitalisation

Hochschule Bremen (HSB) is the second-largest scientific institution, after University of Bremen, in the state of Bremen with a central place in Germany's higher education system. Navozyme and HSB have been collaborating since June 2022 on a pilot project to enhance process efficiencies related to maritime certifications via the application of blockchain technology.

The pilot team analysed the certificate issuance processes at HSB and came upon many friction points. Some of the inefficiencies identified are highlighted below:

- Based on the experience of HSB's students, the process of issuing certificates takes about five weeks from graduation to the arrival of the certificates in the students' mailbox.
- International shipping of certificates is not available. Students must pick up the documents directly at the Registrar's Office upon prior arrangement.
- Changes of nationality or surname are a challenge as the certificates must be issued again in person.

The maritime campus of Hochschule Bremen (HSB).

Digital impact: HSB pilot

A digitalised certification flow makes a real, tangible impact on the stakeholders involved. The team estimated the impact for HSB and some key metrics from the study can be seen below:

15k
Waiting days reduced

1.5k
Wet Signatures Eliminated

12k
Steps digitalised

13k
Paper sheets saved

Assumptions:

The metrics presented are based on assumptions sourced from HSB's STCW certificate issuance process, which includes 10 data fields, 1 signature, and 1.5 paper sheets per certificate, along with waiting times of 22 days per certificate bundle. The final metrics provide valuable insights into the yearly impact of these factors on STCW certification and diploma issuance and are calculated based on a student population of 8003, as of August 2022.

Navozyme and HSB identified areas of high impact via the digitalisation of certification processes - Thousands of administrative hours and manual steps can be saved via the smart application of blockchain technology.

Process transformation

Blockchain to facilitate trust

Blockchain Enabled E-Certificates (BEEs)

Maritime certification processes typically:

- ✓ Involve multiple untrusted parties
- ✓ Deal with critical, sensitive data
- ✓ Are repetitive

These characteristics of maritime certification processes lend well to the application of blockchain technology.

N-CAP, Navozyme's seafarer certification solution, uses blockchain to generate and manage IMO-compliant Blockchain-Enabled Electronic-certificates (BEEs). Each BEE has its unique hash, a digital fingerprint, and offers advanced security features and real-time validation of data via distributed networks. Instant fraud detection and the highest levels of data protection are enabled via N-CAP.

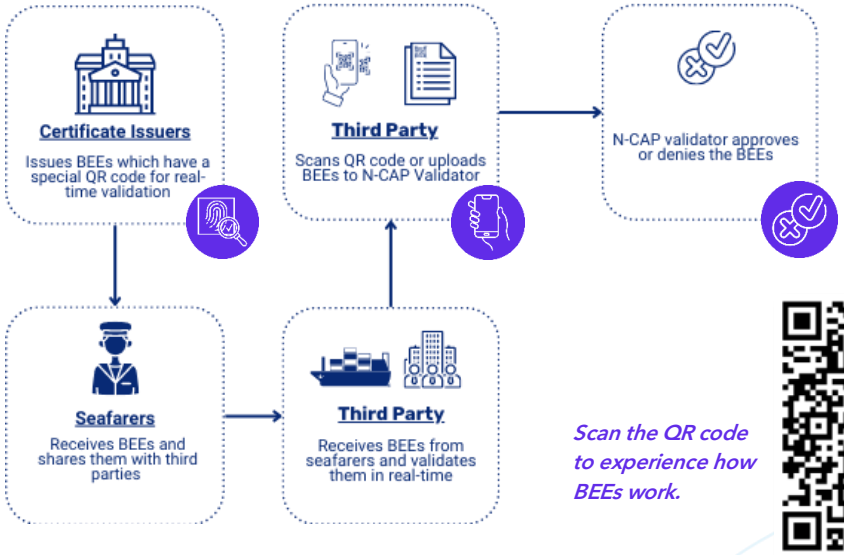
Easing certification processes

With N-CAP, issuers manage, issue, and revoke BEEs through a specially designed cloud Interface, accessible 24x7. On the other hand, seafarers receive their e-certificates automatically on their mobile devices via the N-CAP Wallet app available on the App Store and on Google Play.

Seafarers can present their e-certificates to third parties, who can check the certificate's authenticity via the embedded QR codes. The QR points to a distributed validator, guaranteeing the integrity of the certificate verification process.

Blockchain's key features ensure instant fraud detection and the highest levels of data protection. Maritime certification processes lend well to the application of blockchain technology.

BEE-enhances certification flow



Scan the QR code to experience how BEEs work.

Success Cases

Leading institutions pave the way

The Maritime Academy of Asia and the Pacific

The Maritime Academy of Asia and the Pacific (MAAP), Philippines, is a prestigious training institution founded by the leading seafarers union, Associated Marine Officers' and Seamen's Union of the Philippines (AMOSUP). Together with AMOSUP, MAAP's seafarer network reaches over a hundred thousand Filipino seafarers.

As part of their continuous efforts to raise overall industry standards, MAAP has partnered with Navozyme since 2019 to implement digitalised certification processes via N-CAP, pioneering the use of blockchain technology in the country[8]. The use of N-CAP has helped MAAP reduce the Registrar's Office 's administrative time and ensure the traceability of the certificates.

The International Association of Maritime Institutions

The International Association of Maritime Institutions (IAMI) is a century-old association that supports the maritime training sector by bringing together nautical colleges and other Maritime Education and Training providers to foster and share good practices. IAMI administers exams globally on behalf of the Maritime and Coastguard Agency of the UK.

Navozyme created the new IAMI examination system which automatically generates BEEs for eligible candidates, enhancing productivity and data protection, while also facilitating decarbonisation by eliminating the need for paper printing and couriers.

1.8k cadets annually

100k + seafarers in MAAPs network

"MAAP is proud to be the first Filipino training institution to adopt N-CAP…"

Jo Ann I. Manuel, Registrar at MAAP

2.5k + certificates issued

23 Exam centers connected globally

"…IAMI is proud to operate a world-leading digital solution…"

Lars Lippuner, President of IAMI

Thousands of BEEs have already been issued by these leading institutions with hundreds more every month. All BEEs offer the highest levels of data protection and can be verified in real-time.

8 MAAP Pioneers Blockchain in the Philippines.

The Future

A joint effort to facilitate digitalisation

Embracing digitalisation is crucial for driving real change and achieving lasting transformation in the maritime industry.

Resistance to change, lack of standardization, the need for significant investment in technology and infrastructure, and concerns around data privacy and security are some of the main hurdles to adopting digital certification in the maritime industry. Despite these challenges, the tide is moving towards digitalization, and early adopters are already experiencing its benefits. In the coming years, we can expect guidelines around digital certification to become increasingly standardized, and those who do not embrace digital solutions risk falling behind.

Collaboration among industry peers, technology providers, and other stakeholders is essential. By leveraging each other's strengths, sharing knowledge and resources, and working together, a positive transformation of the global maritime industry can take place bringing forth significant benefits, including enhanced data privacy and security, increased efficiency, reduced costs, enhanced safety, and improved environmental sustainability.

Furthermore, the benefits of digital certification extend beyond individual organizations to the wider maritime ecosystem, encompassing Flags, Maritime Training Institutions (MTIs), Crewing Agencies, port authorities, ship owners/operators/ managers, medical providers, and seafarers. By adopting digital solutions, the maritime industry can create a more transparent and interconnected industry that delivers value for all stakeholders.

This whitepaper is a call for the industry to come together and embrace innovation, collaboration, and transformation, and drive real change.

Collaboration is the key to driving the digital transformation of the global maritime industry. It requires a mindset change and collective efforts.

About Navozyme

Navozyme is an award-winning technology scaleup on a mission to accelerate the digitalisation and decarbonisation of the global maritime industry. Commended for its pioneering work by prestigious organisations like the IMO, Navozyme applies Blockchain and AI, to reduce complexity and friction for critical maritime processes. Navozyme's solutions facilitate real-time interchange of authentic data amongst various actors enabling decarbonization, higher productivity, enhanced compliance & cybersecurity. Beneficiaries include Training Institutions, Seafarers, Port Authorities, Shipowners, Agents, MARPOL Operators, amongst others. Navozyme's solutions enable 1) Seafarers' Certificates Management and 2) Quicker ship turnaround via smarter Port Call Administration, including Port Clearances, Ships' Waste Declarations & Bunker optimization.

About the Authors

Anjaney Borwankar (AFNI, MBA) is the Co-Founder & Chief Executive of Navozyme. A former seagoing officer, he directly experienced many of the pain points described in this whitepaper.

Anjaney designed the "*Blockchain for Maritime Professionals*" programme which has been appreciated by hundreds of maritime leaders from all over the world. The programme has been conducted at the IMO's headquarters in London, at the Singapore Management University, and for The Nautical Institute, London.
Anjaney was awarded the runner's up prize for the President's Gold Medal and a first class Bachelor of Science (Nautical Studies) degree from T.S. Chanakya, Mumbai University. He is an alumnus of IESE Business School (MBA) and Oxford University (Blockchain). In his previous roles, Anjaney has worked for prestigious institutions like McKinsey & Company, Maersk (A.P. Moller) and IESE Business School.

Current honorary roles include:

- International Advisory Board member for the Business School Netherlands
- Co-Chair of EuroCham's Digital Economy Committee, Singapore

Prof. Dr. Ilknur Colmorn is the Head of the Department for International Maritime Studies at HSB, Bremen. She has over 15 years of experience in the maritime industry and has published papers on incident reporting and best practices in shipping, with a focus on the Baltic Sea.

Ilknur has held academic roles at the University of Applied Sciences Emden/Leer and Jacobs University Bremen, where she was a PhD student and Research Associate in International Logistics. She also has industry experience as a Process Engineer at Fraunhofer-Institut für Software- und Systemtechnik ISST.

Ilknur holds a Doctor of Philosophy in International Logistics from Jacobs University Bremen, a Master of Science in Nordic Master in Maritime Management from Chalmers University of Technology, and a Bachelor's degree in Maritime Studies - Deck from Istanbul Technical University.

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