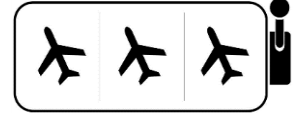


EU-funded project SlotMachine to use blockchain technology for more cost-efficient slot configuration



With passenger numbers expected to gradually rise again, the aviation industry will be confronted with growing air traffic and limited capacity at airports and in the air. This may lead to an increase in delays again where airlines need to prioritise their important flights. At the same time, airlines are struggling with increased cost pressures while the highest safety standards continue to demand compliance with complex processes. The EU-funded project SlotMachine aims to develop a cost-efficient solution, enabled by blockchain technology, which will extend the existing slot swapping capabilities between different airlines.

Together with EUROCONTROL, the AIT Austrian Institute of Technology, University of Linz (Austria), and Swiss International Airlines, Frequentis aims to foster the emergence of a new kind of marketplace for airlines exchanging slot priorities in Air Traffic Management (ATM). The platform to be developed by the SlotMachine consortium is expected to enable more flexible, faster, scalable, and (semi-) automated processing of slot sequence transactions in a fair and trustworthy way. Built with a privacy-first approach, the aim will be to protect sensitive airline data from competitors and airport operators and therefore fully unleash the potential of slot swapping.

The project will focus on the user-driven optimisation in the allocation of Air Traffic Flow Management (ATFM) slots to flights. ATFM slots are allocated times of departure, which are issued by EUROCONTROL's Network Manager to regulate traffic in congested areas of airspace. Until now, simple exchanges between two flights from the same airline company have been possible. These are a helpful way for airlines to prioritise expensive flights in order to minimise delays and keep costs down.

Slot swapping between different airlines are currently restricted to two flights. The flight cost structures, which may vary for any number of reasons, from the provisioning of connecting flights for passengers or work-time restrictions for crew members, is confidential information for the airlines. This is where the SlotMachine project comes in. The objective is to optimise the allocation of flights according to the airline priorities, based on the cost structure of the different airlines. By using blockchain technology and a secure multi-party computation, the project aims to extend the existing User-Driven Prioritisation

Process (UDPP)¹ solution currently in development in SESAR 2020 to allow more flexible prioritisation with no need for the disclosure of any confidential information.

This technology allows secure, auditable transactions without the need for a central broker, whereby stakeholders are able to enter transactions without disclosing information to other users. By demonstrating the feasibility of a privacy-preserving platform, the foundation can be laid for the development of a product that will be an essential element in the aviation industry in the future. It is also expected to lead to a better use of existing resources at airports, higher efficiency of airlines, lower emissions, and shorter delays for passengers.

To ensure the validity of the results, the project will hold an external advisory board to review requirements, design decisions, as well as a demonstrator in two or three iterations throughout the project duration. Representatives from airlines, airports, or ANSPs and other interested stakeholders who want to review and validate the outcomes of this project can still join the advisory board and participate in the upcoming workshops (with the first due to take place at the end of April).

For more detailed information, please visit the project website:

<https://www.frequentis.com/en/research/projects/slotmachine>

This project has received funding from the SESAR Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement No 890456.



About FREQUENTIS

Frequentis, headquartered in Vienna, is an international supplier of communication and information systems for control centres with safety-critical tasks. Such 'control centre solutions' are developed and marketed by Frequentis in the business sectors Air Traffic Management (civil and military air traffic control, air defence) and Public Safety & Transport (police, fire brigade, ambulance services, shipping, railways). As a global player, Frequentis operates a worldwide network of branches, subsidiaries and local representatives in more than 50 countries.

Products and solutions from Frequentis can be found in over 30,000 operator working positions and in approximately 140 countries. Founded in 1947, Frequentis considers itself to be the global market leader in voice communication systems for air traffic control with a market share of around 30%. In addition, the Frequentis Group's AIM (aeronautical information management) and AMHS (aeronautical message handling) systems, as well as GSM-R systems for Public Transport are industry leading global solutions.

The shares of Frequentis AG are traded on the Vienna and Frankfurt Stock Exchange under the ticker symbol FQT (ISIN: ATFREQUENT09). In 2019, the Frequentis Group had about 1,850 employees worldwide and generated revenues of EUR 303.6 million and EBIT of EUR 17.2 million.

For more information, please visit www.frequentis.com

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¹ SESAR PJ07S02 UDPP

About AIT Austrian Institute of Technology

The AIT Austrian Institute of Technology is Austria's largest non-university research institute and regards itself as a highly specialized research and development partner for industry. AIT has about 1.400 employees and provides research and technological development to realize basic innovations for the next generation of infrastructure related technologies.

Over 200 experts at the Center for Digital Safety & Security are developing state-of-the-art information and communication technologies to ensure that our systems are highly secure and reliable in the context of comprehensive digitization and global networking. The Center has an international leading track record in next generation cryptography and blockchain technologies. Furthermore, the Center has a recognized position in national and international innovation programs such as KIRAS and H2020 and is a shaping part of industry and research initiatives such as QCI Quantum Communication Infrastructure Europe or ECSO European Cyber Security Organization. The research activities of the Center focus on key technology areas such as distributed IT systems and the Internet of Things (IoT), cyber security for IT and Industrial Control Systems, state-of-the-art cryptographic methods (post quantum encryption) and highly secure and highly available software and systems.

With this technological competence the Center addresses different markets, such as the semiconductor industry, the automotive sector, critical infrastructures such as energy network and power plant operators, financial markets, as well as the security sector in the context of critical infrastructure protection, environmental monitoring and crisis and disaster management. Strategic technology research is carried out in close cooperation with industry, science and the public sector, from the development of prototypes to the validation of applications.

For more information, please visit www.ait.ac.at/dss

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About EUROCONTROL

EUROCONTROL is a civil-military intergovernmental organisation with 41 Member States and 2 Comprehensive Agreement States; our States stretch from Ireland to Armenia, Norway to Morocco.

Our mission is to support European aviation to become safer, more efficient, more cost-effective and with a minimal impact on the environment. We do this working closely with our Member States the European institutions and our stakeholders, which include air navigation service providers, civil and military airspace users, airports and aircraft and equipment manufacturers.

EUROCONTROL employs more than 1,900 highly qualified professionals spread over four European countries. Their expertise is deployed to address ATM challenges in a number of key roles: The Network Manager has extended the role of the former Central Flow Management Unit to proactively manage the entire ATM Network (nearly ten million flights every year), in close liaison with ANSPs, airspace users, the military and airports. The Maastricht Upper Area Control Centre provides an air traffic control service for the Netherlands, Belgium, Luxembourg and northern Germany. The Central Route Charges Office handles billing, collection and redistribution of aviation charges. It supports the EC, EASA and National Supervisory Authorities in their regulatory activities. It provides a unique platform for civil-military aviation coordination in Europe.

Finally, EUROCONTROL is a major player in European ATM research, development and validation and in this respect makes the largest contribution to the SESAR Joint Undertaking. <https://www.eurocontrol.int/>

About Johannes Kepler Universität Linz (JKU)

JKU Linz is the largest university in Upper Austria with a strong background in technology and applied research that turns theoretical outcomes into successful applications. In SlotMachine, JKU Linz is represented by the Institute of Business Informatics – Data & Knowledge Engineering (DKE). DKE's research agenda emphasizes theoretical as well as applied research in the areas of knowledge representation, data engineering, business intelligence and analytics, and business process management. In recent cooperative research projects with industry partners, funded through various EU Horizon 2020 and national research grants, DKE has applied its know-how in order to solve practical problems in knowledge representation and data analytics in the domains of air traffic management, precision dairy farming, and health insurance, respectively. DKE's research results are regularly published in high-quality peer-reviewed international conferences (e.g., EDOC, CAiSE) and journals (e.g., Semantic Web, Information & Management, ACM Transactions on the Web, Software and Systems Modeling, Journal of Organizational Computing and Electronic Commerce).

For more information, please visit www.jku.at and www.dke.jku.at

About SESAR Joint Undertaking

SESAR is the technological pillar of the EU's Single European Sky policy and a key enabler of the EU Aviation Strategy. SESAR defines, develops and deploys technologies to transform air traffic management in Europe. The SESAR Joint Undertaking (SESAR JU) is the public-private partnership set up to define and deliver technological solutions to make this transformation a reality. It works with all actors in the aviation value chain to agree on the research and development priorities, as well as technology roll-out plans, which are documented in the European ATM Master Plan - a collaboratively-agreed roadmap for ATM modernisation. Founded by the European Union and Eurocontrol, the SESAR JU has 19 members, who together with their partners and affiliate associations represent over 100 companies working in Europe and beyond. The SESAR JU also works closely with staff associations, regulators, airport operators, airspace users, the military and the scientific community.

For more information, please visit <https://www.sesarju.eu/>

About Swiss Airlines

Swiss International Air Lines (SWISS) is the airline of Switzerland. In 2019 the company served over 100 destinations in 45 countries worldwide from Zurich and Geneva and carried almost 19 million passengers with its fleet of around 90 aircraft. Its Swiss WorldCargo division provided a comprehensive range of airport-to-airport airfreight services for high-value and care-intensive consignments to around 130 destinations in more than 80 countries. As "The Airline of Switzerland", SWISS embodies its home country's traditional values, and is committed to delivering the highest product and service quality. With its workforce of some 9,500 personnel, SWISS generated total revenues of over CHF 5 billion in 2019. SWISS is part of the Lufthansa Group, and is also a member of Star Alliance, the world's biggest airline network.

SWISS is committed on various fronts to the careful and sustainable use of natural resources and pursues a responsible attitude towards the environment as an integral part of its corporate culture. Various internal projects to reduce fuel burn and increase flight efficiency in general have been conducted. The average fuel consumption per 100 passenger kilometres has decreased from 4.39 liters in 2003 to 3.15 liters in 2018 thanks to the replacement of older aircrafts with B777-300 and the brand-new Airbus A220 (formerly known as C Series). For more information, please visit www.swiss.com

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