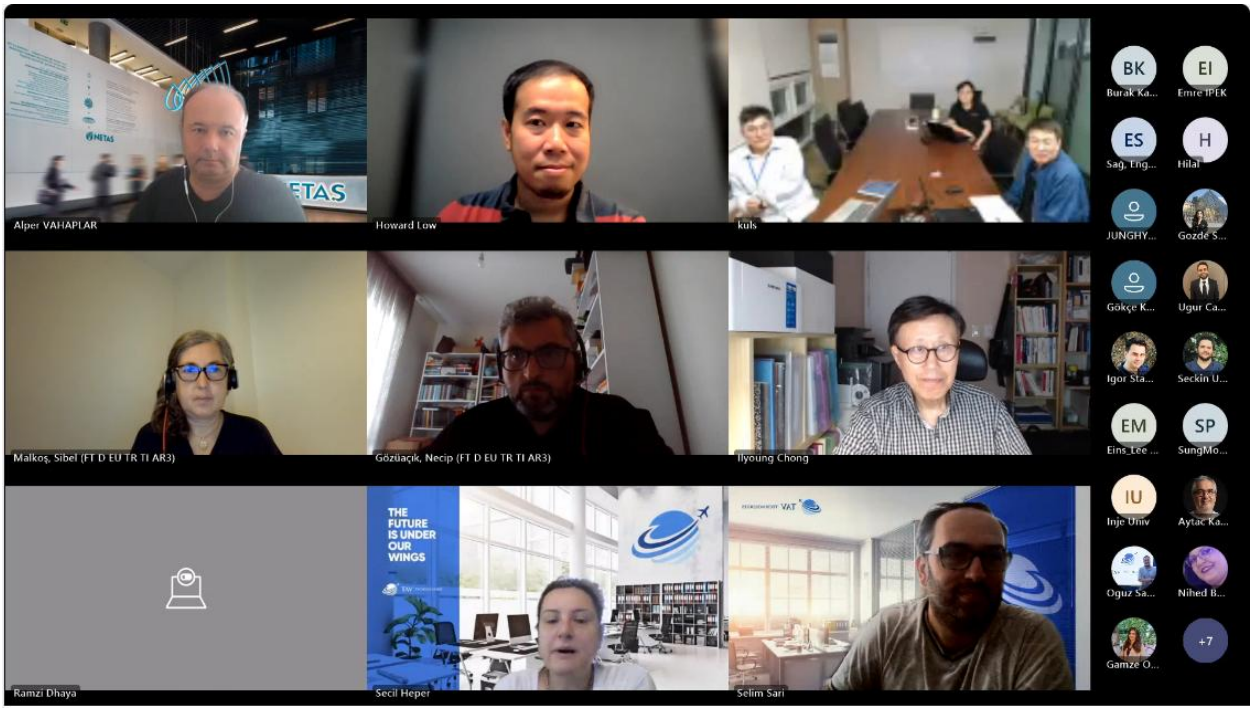

The SOCFAI Online Project Promotion Event #2 took place on September 30, 2025. The session was organized and moderated by Selim Sarı and brought together representatives from all consortium partners. The meeting served as a comprehensive progress-sharing platform where each partner presented their work across various technical domains, including logistics optimization, AI-driven analytics, IoT-based monitoring, computer vision, social media sentiment analysis, and advanced energy management.

The participants who took active roles during the meeting included Selim Sarı, Kim Young Geol (김영걸), Koray, Gözde Sayın, Ilyoung Chong, Junghyun Lee, Egehan Sayan, Burak Kadıoğlu, Sibel Malkoş, Necip Gözüaçık, Engin Sağ, Onur Adıgüzel, Speaker 1 from Netash, Emre İpek, Hilal, İsmail Uzun, Igor Stankovski, Secil Heper, and Howard Low. These individuals appeared as speakers or contributors within the meeting transcript.

The event opened with a presentation by ISSNC from Korea. First, 김영걸 introduced a digital-twin-based optimal dispatch system for port logistics, focusing on the challenges of inefficiency caused by uneven truck assignments and unbalanced container movement. He explained how real-time port data, optimization algorithms, and simulation contribute to producing an ideal dispatch plan that minimizes waiting time, fuel consumption, and operational costs. Following this, Junghyun Lee presented an AI-based optimization framework for CFS operations. He described major operational issues such as limited yard capacity and the blocking problem, and introduced a two-layer optimization approach covering both inter-CFS and intra-CFS planning. He also explained the addition of a blockchain-enabled trust layer that addresses auditability, data integrity, and inter-organizational transparency.

TAV Technologies followed with multiple updates. Burak demonstrated three prediction systems: aircraft arrival prediction, passenger density estimation, and baggage analytics. These systems help

improve operational readiness during peak periods. Later, Selim introduced the first prototype of the Airport Cockpit Platform, envisioned as a unified operational view for airport management. The demonstration included real-time airport performance graphics, operational health diagnostics, flight management overviews, passenger flow analytics, IoT sensor status monitoring, and incident management. Selim emphasized that the platform aims to become a collaborative ecosystem supporting data from multiple partners.

Siemens then presented extensive work on baggage analytics and optimization. Sibel described the development of a real-time dashboard that displays operational metrics such as rejected bags, transfer baggage ratios, and temporal distributions. Necip explained the creation of machine learning and deep learning models for daily, hourly, and 15-minute baggage predictions, highlighting that tree-based ensemble models performed best, supported by SHAP analyses to interpret feature contributions. Engin presented studies on the relationship between baggage pattern irregularities and flight delays, demonstrating a measurable correlation. He also introduced adaptive prediction, which dynamically adjusts future estimates based on live baggage arrivals. Onur concluded with new features including an AI assistant capable of interacting with system data and sustainability dashboards that calculate carbon emissions, water equivalence, and required tree offsets.

Netaş presented developments on IoT-enabled energy and air-quality monitoring within the airport. Their representative explained the deployment of dozens of temperature, humidity, and particulate matter sensors at Adnan Menderes Airport, integrated through LoRaWAN into the software platform. The system allows real-time air-quality assessments and triggers HVAC-related alarms when thresholds are exceeded. They also shared that the SoC5 project contributed directly to the creation of a new commercial IoT product now deployed in their production facility. Upcoming work includes combining air-quality data with passenger and flight data to optimize HVAC energy use, detect anomalies, and implement predictive maintenance across devices.

Inosens then provided two separate presentations. Emre described the LIDAR-based people detection project, explaining how Velodyne VLP-16 sensors were used to collect point-cloud data in the airport security area. After labeling the dataset, models such as PV-RCNN, SECOND, and VoxelNext were trained, with VoxelNext yielding the highest accuracy. A demonstration video showed successful 3D pedestrian detection in real airport scenes. Hilal presented the social-media sentiment analysis project, explaining the use of BERT-based models for multilingual sentiment classification. After gathering passenger reviews from platforms such as Google Maps and Twitter, the team balanced the data through NLP augmentation and built a FastAPI-based service that performs language detection and sentiment scoring. Visual comparisons between flight delays and the volume of negative comments showed strong temporal correlations.

The final presentation was delivered by Howard Low from Enverse. He introduced an energy forecasting and optimization system tailored for airport operations, using machine learning and linear programming to model electricity, heating, and cooling demand. He explained the complexities of simultaneously managing grid energy, trigeneration output, and HVAC requirements. He also introduced the airbridge HVAC optimization scenario, which reduces unnecessary cooling during long idle periods while ensuring operational temperatures are maintained prior to aircraft arrival. Howard demonstrated the Enverse UI for device comparison and digital-twin-based anomaly detection, enhanced with a built-in LLM explainer that assists engineers by interpreting abnormal

behavior. Future steps include full integration with the AOCC, end-to-end control automation, and comprehensive carbon accounting.

The meeting concluded with closing remarks from Selim, expressing appreciation for all partners and suggesting that a third online promotion event could be held at the end of the project. Participants briefly opened their cameras for a group snapshot, and the session was formally closed afterward.