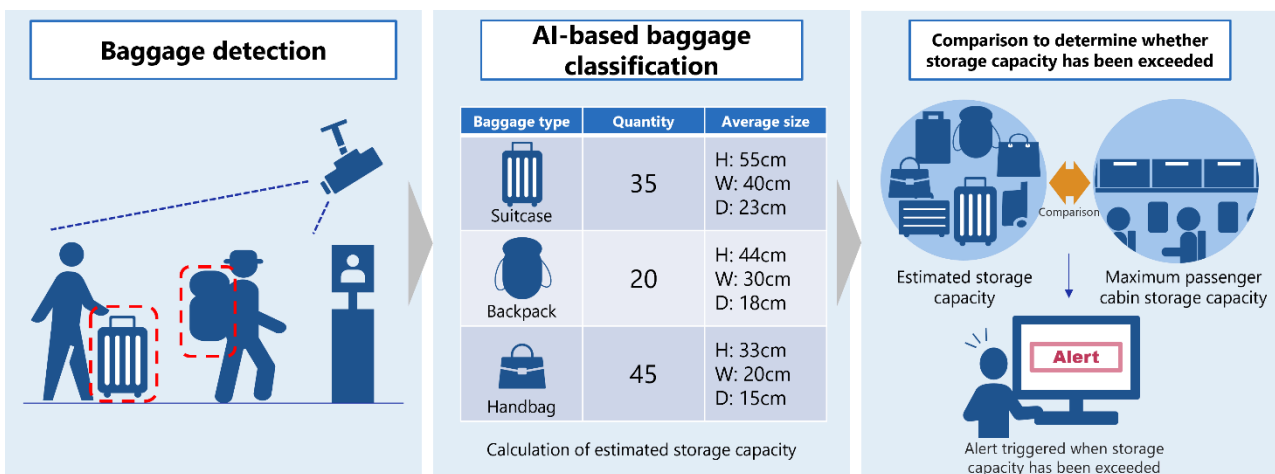# JAL and NEC Test AI-Powered Carry-On Baggage Analysis Solution

- Contributing to the prevention of flight delays and enhancement of customer satisfaction -

Tokyo, November 29, 2024 - Japan Airlines Co., Ltd. (JAL) and NEC Corporation (NEC) have jointly conducted a trial of the "NEC Baggage Counting Solution" (*1), which uses artificial intelligence (AI) to automatically analyze the quantity and types of carry-on baggage at boarding gates. The solution, a world first (*2), enables measures to be taken for carry-on baggage, which is one of the causes of flight delays, aiming to improve on-time performance and ensure smooth boarding.

Based on the results of this trial, JAL is exploring methods for implementing the solution in the future.
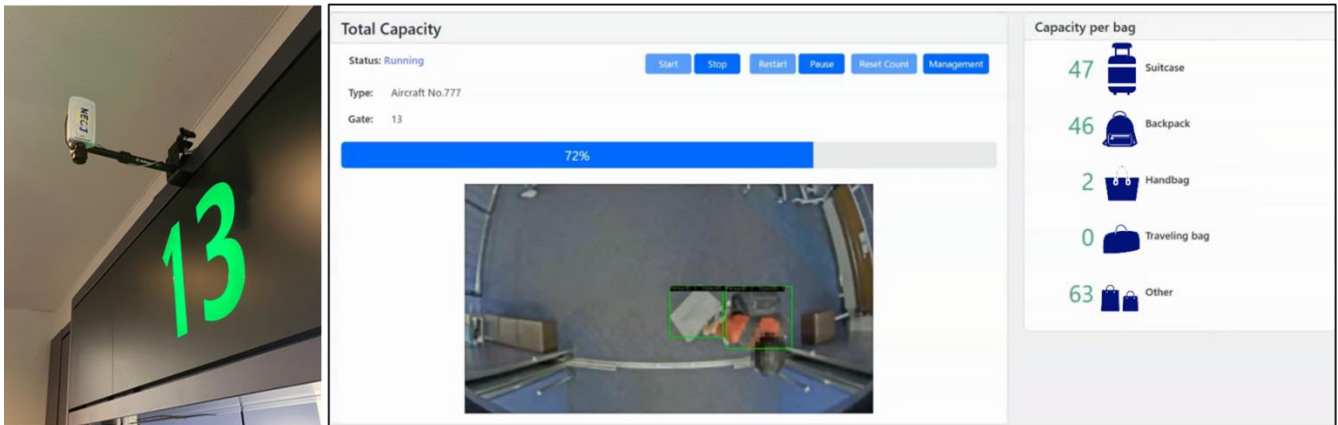

Baggage detection

AI-based baggage classification

Baggage type	Quantity	Average size
Suitcase	35	H: 55cm W: 40cm D: 23cm
Backpack	20	H: 44cm W: 30cm D: 18cm
Handbag	45	H: 33cm W: 20cm D: 15cm

Calculation of estimated storage capacity

Comparison to determine whether storage capacity has been exceeded

Estimated storage capacity

Comparison

Maximum passenger cabin storage capacity

Alert

Alert triggered when storage capacity has been exceeded

Schematic diagram of the NEC Baggage Counting Solution

Background

Excess cabin baggage can lead to congestion in the aisles as passengers spend extra time storing their items in the overhead bins. It may also result in baggage being transferred to the cargo compartment after boarding has commenced, thereby increasing boarding time and potentially causing flight delays.

Overview of the trial

Conducted from April to September 2024 at Boarding Gate 13 in Terminal 1 of Tokyo International Airport (Haneda), the trial involved evaluating the solution's analysis accuracy (detection and classification accuracy) and its alert timing for exceeding overhead storage limits to determine its effectiveness.

Camera and user interface for testing the
NEC Baggage Counting Solution

Trial details:

1. Cameras installed at the boarding gate capture footage, which is analyzed using AI to detect cabin baggage carried by passengers.
2. Detected baggage is classified into predefined categories, and the space each item would occupy in overhead bins is estimated in real time.
3. An alert is triggered when the estimated storage capacity reaches a preset threshold.

Results and future prospects

The solution enabled the collection and analysis of data on baggage amounts and alert frequency. This data can be used to develop concrete measures to prevent departure delays due to baggage storage and the reloading of baggage in the cargo compartment.

Going forward, JAL will continue utilizing digital technology to ensure smoother boarding, improve punctuality, and optimize the overall customer experience.

NEC provides end-to-end services for this kind of digital transformation (DX) through the "NEC BluStellar" value-delivery model. NEC BluStellar transforms business models to address social and business challenges by applying diverse industry insights and world-leading technological expertise to the entire DX process, from customer strategy consultation through implementation.

Notes:
(*1) Patent pending.
(*2) According to NEC research as of November 2024.