

However, even after a passenger is processed via such self-service electronic kiosk, typically such systems still rely upon a passenger's accompanying baggage to be dropped by the passenger at baggage drop counters operated or supervised by a staff member. The staff member ensures that any passenger issues that arise
5 during the baggage drop process can be readily addressed, as well as ensuring passengers do not intrude onto the conveyor system which receives the baggage. A disadvantage of such a system is that it can merely transfer the bottleneck in processing time from the check-in stage to the baggage drop stage.

New systems have been developed in which both the check-in and the baggage
10 drop stages are substantially automated. However, such systems typically require substantial modification and or replacement of existing counters and have a high installation cost. In the event of a system error (which inevitably occurs at peak passenger usage times) such systems are also usually unable to be operated in a manual mode by a staff member.

15 **SUMMARY OF THE INVENTION**

Aspects of the invention are defined in the independent claims. Some optional features of the invention are defined in the dependent claims. Implementation of the techniques disclosed herein may at least partially address or alleviate at least some of the identified problems of the known baggage drop systems.

20 In one example there is provided a baggage drop system for receiving baggage from a passenger comprising:

a housing adjacent a conveyor system for receiving baggage, and including first and second systems, wherein

said first system is operable by the passenger to generate a baggage identification tag upon receipt of passenger information, and to actuate the conveyor system upon determination that baggage parameters are within pre-determined limits;

detected by detectors mounted to the housing. The detectors may be infrared detectors. A first infrared detector may be arranged on the side of a housing of a first baggage drop system and a second infrared detector may be arranged on the housing of an adjacent baggage drop system.

5 The housing may include at least one or more apertures arranged to receive one or more of baggage labels or baggage claim receipts from a printer of the first system.

The conveyor system may include three independently actuable belts. A first baggage item on a second conveyor belt may be returned to the passenger where the combined parameters of the first item of baggage and second item of baggage

10 exceed a pre-determined limit.

The baggage drop system may further comprise a switch, wherein upon actuation of the switch one of the first system and second system is rendered inoperable and the other is activated.

The first system and the second system may be independently operable at different

15 times.

According to a further arrangement there is provided a baggage drop counter for receiving baggage from a passenger comprising:

a housing adjacent a conveyor system for receiving baggage;

a first display mounted to the housing, the first display being movable from a

20 passenger operable position above the conveyor system to an inoperative position proximal the housing;

a first scanner disposed in the housing for receiving passenger identification information;

- a computing means for receiving passenger information and detecting baggage weight and size information from sensors and upon determination that the baggage parameters fall below pre-determined limits, actuating the conveyor system;
- a baggage identification tag generator operable by a passenger;
- 5 a second display arranged for displaying information to a second person;
- a second computing means for receiving passenger information; and for enabling the second person to actuate the conveyor system;
- a printer for generating a printed baggage label, baggage receipt and boarding pass information upon selection by a second person; and
- 10 a switch for changing the baggage drop system from the first system to the second system.

The baggage identification tag generator may include a baggage label printer operable by a passenger. Optionally, the first scanner may be configured for detecting passenger information and encoding a memory device in the baggage

15 identification tag.

According to a further arrangement, there is provided a method of modifying the operation of a baggage drop counter having a housing and a conveyor system, so that the baggage drop counter provides passenger operable baggage drop operation and assisted baggage drop operations at separate times, the method

20 comprising:

installing a display movable between an operative position above the conveyor system and an inoperative position proximal the housing; and

providing a computing means connected to network information, and configured to receive passenger information and baggage parameters, and generate a baggage identification tag.

The method may further comprise the step of generating a baggage label by a label
5 printer in the housing accessible to a passenger.

The method may further include providing a scanning device connected to the computing means.

The baggage identification tag may be generated by encoding an RFID tag using a passenger operable scanner.

10 The method may further include installing an image acquisition device in communication with the computing means.

According to a further arrangement, there is provided a retrofit baggage drop system for use with an existing baggage counter, the existing baggage counter having a housing adjacent a conveyor system for receiving baggage, and
15 comprising an existing display, a baggage label printer and a computer, the retrofit baggage drop system comprising:

a system operable by the passenger to generate a baggage identification tag upon receipt of passenger information, said system actuating the conveyor system upon determination that baggage parameters are below pre-determined limits

20 wherein the existing system and the system operable by the passenger are independently operable.

The retrofit baggage drop system may further comprise:

The display may be arranged in an inoperative position to substantially cover the recess and scanner.

The system operable by the passenger and the existing system may be independently operable at different times.

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BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described by reference (but without limitation to) the accompanying figures in which:

Fig. 1a is a perspective view of a baggage drop system as seen by a passenger
10 when in an assisted bag drop configuration.

Fig. 1b is the view of a baggage drop system of Fig 1a as seen by a staff member.

Fig. 2a is a perspective view of a baggage drop system from a passenger perspective during change from an assisted bag drop configuration to a self check-in configuration.

15 Fig. 2b is a perspective view of a baggage drop system of Fig 2a as seen by a staff member.

Fig. 3a is a perspective view of a baggage drop system in a self check-in configuration.

20 Fig. 3b is the view of a baggage drop system of Fig 2a from a staff member perspective behind the counter.

Fig. 4 is an enlarged side view of an exemplary scanner depicted in Figs. 1 -3 when the baggage drop system is in the self check- in configuration.

Fig. 5a is an operational view of a printer drawer for receiving a printer.

Fig. 5b is a view of an exemplary printer drawer of Fig. 5a in an opened state.

Fig. 6 is a view of an exemplary RFID encodeable baggage tag with details which are printed by the passenger in an additional embodiment of the baggage drop system.

Fig. 7a is a perspective view of an embodiment of the baggage drop system in a self check-in configuration depicting multiple conveyor systems as seen by a passenger.

Fig. 7b is a perspective view of the baggage drop system of Fig. 7a as seen by a staff member.

Fig. 8a is a schematic representation of a successful process for passenger baggage drop with multiple baggage items when the system is in a self check-in configuration.

Fig. 8b is a schematic representation of an unsuccessful passenger baggage drop with multiple baggage items when the system is in a self check-in configuration.

Fig. 9 is a schematic flowchart setting out the main steps.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In a broad aspect there is provided a baggage drop system, baggage drop counter, method of modifying a baggage drop counter and a retrofit baggage drop system operable in an assisted state or in a passenger operable state.

Reference is made to Figs. 1a and 1b in which the baggage drop system is depicted in an assisted check-in configuration. The baggage drop system **10** depicted includes a housing **20** located adjacent a conveyor system **30**. Not shown, and

omitted for clarity are the monitor and computer system which is used by a staff member assisting the passenger to check-in and/or drop baggage when the baggage drop system is in the state shown.

As is known in the art, a typical check-in counter or system works by a passenger
5 approaching a staff member stationed behind the housing **20**. The passenger produces identification documents (such as a passport) and booking information to the staff member. Upon verification of the passengers' identity, a boarding pass may be printed from a printer (not shown) and provided to the passenger.

Furthermore, as is known in the art, once the passenger information and boarding
10 pass have been produced, the staff member can verify that the baggage meets pre-determined weight limits using the weighing scale **32** included in the conveyor system. Once the baggage is determined to fall within the pre-determined limits, it is despatched on the conveyor system by the operation of the agent or staff member behind the counter. It would be appreciated in this configuration (assisted check-in
15 configuration), the additional retrofit passenger operable baggage drop system of which several integers are visible in Figs. 1a and 1b is in an inoperative position.

Referring now to Figs. 2a and 2b, passenger and staff member perspective views of the system are depicted. As depicted, the system is in the process of being changed from the assisted check-

In the embodiment depicted, the drawer comprises two units **60a** and **60b** which are slideable relative to each other. Being able to slide the printers enables easy replacement of the printers, ink, and paper consumables. It would be appreciated that other arrangements of the printer drawer could be also provided.

5 Referring to Fig. 6 there is depicted an exemplary scanning device **56** with an embodiment of a baggage tag suitable for use with embodiments of the baggage drop system

As used herein, and in the embodiment depicted, there is shown a baggage tag **75** comprising a pouch **77** including an RFID encodable chip **79**. The baggage tag **75**
10 shown is configured to include readable indicia encoding passage/passenger information which is readable by both human and computer systems

The scanning device **56** may be configured to read passenger provided information (either in the form of a passenger printed tag, QR code, image on a personal electronic device or the like); and also perform an encoding function of the chip
15 memory which can interface with the scanner. A person skilled in the art would appreciate that such chip memory may be an RFID tag, memory chip or similar.

Specifically, upon retrieving relevant passenger information, and determining the baggage meets the pre-determined limits, the scanner can be configured to encode an RFID baggage identification tag with relevant information.

20 This is an alternative mode of operation to using only a printed baggage label which is described in detail above, and requires only a slight modification to the steps/equipment described in the present application. In this configuration an additional printer for the baggage label becomes optional, with the scanner used being able

baggage to provide a baggage check receipt. Alternatively, no printer may be included, with electronic records only stored by the system.

Other steps in the interaction by the passenger with the system in the passenger operable mode remain generally the same.

5 Reference is now made to Figs. 7a and 7b, which depict an exemplary embodiment of the baggage drop system in which there are three separately actuable conveyor systems. The first conveyor system **33** includes therein a scale **32** which are able to detect baggage parameters (including size and weight of a first baggage item **70** placed upon that conveyor system **33**).

10 In the embodiment depicted, the first item of baggage **70** has proceeded over the second conveyor system **34** to the third conveyor system **35** after being tagged by a passenger.

The passenger has then introduced a second baggage item **72** and is in the process of preparing a baggage tag for this item.

15 It would be appreciated that although three separate conveyor systems have been depicted for the baggage reaches the main trunk conveyor **37**, other arrangements including further additional conveyor systems would also be possible.

However, the advantage depicted is that if the second or further item of baggage is determined to exceed pre-determined weight, size or other limits, the first item of
20 baggage may be retrieved by the system and the passenger can proceed to staff assisted to check in. This may be compared to other prior art systems where once the item of baggage has been processed, it is transported to a main trunk conveyor system even before detection that the second item of baggage exceeds pre-determined parameters.

As can be appreciated, the arrangement overcomes the deficiencies of such previous prior art systems in which there is no way to retrieve the first item of baggage if the second or subsequent items of baggage exceed pre-determined parameters.

5 This process according can be understood with ready reference to the arrangements depicted in Figs. 8a and 8b. These arrangements depict the various modes of operation of the conveyor system of Figs. 7a and 7b. The three conveyor systems **33**, **34**, 35and **37** are shown.

As shown at Step 1, a passenger arrives at the baggage check in with multiple items
10 of baggage. Upon weighing and tagging the baggage at Step 2, the first conveyor system **33** and second conveyor system are actuated to transport the baggage to the third conveyor system **35** at Step 3. At Step 4, the second baggage item is placed on the first conveyor system weighed and tagged and then it proceeds to the second conveyor system in Step 5. The passenger then is able to leave the
15 system as shown in Step 6.

Referring to Fig. 8b, a similar scenario occurs, where a passenger arrives with multiple items of baggage. However, in this case the second baggage item is detected at Step 5 to exceed the pre-determined baggage parameters. Assistance is required to return the first and second baggage items to the passenger at Step 6
20 to proceed to agent assisted baggage drop potentially including further payment of baggage fees.

Advantageously the improved baggage drop system provides for efficient operation of existing airport infrastructure, allowing airport infrastructure to operate in either agent assisted check in and baggage drop off mode, or in passenger operated baggage drop off mode. The ability to rapidly switch between these modes of operation means that an airport can rapidly initialise and deploy additional baggage drop facilities in the event of an unexpected surge of passenger numbers or at times of peak capacity.

In the exemplary arrangement described, the change-over between modes can be rapidly carried out by actuation of a single switch and movement of the passenger operable display system from an inoperative position to an operable position.

As would be appreciated by a person skilled in the art, when the improved baggage system and method as disclosed herein are operating in passenger operable mode it can provide for a photographic record of the baggage deposited in the system, which is useful in the event of subsequent baggage damage or loss.

As the present techniques enable effectively two systems to operate independently within each check-in counter, it increases the redundancy in the baggage drop/checking in process, thereby increasing the ability of a transport services provider such as an airport to operate each counter in the event of a malfunction or breakdown of any equipment.

The use of sensors placed either on the housing or on the conveyor systems to prevent the inclusion of baggage exceeding pre-determined limits maintains the integrity of the baggage drop system.

Advantageously, the inclusion of multiple independently actuatable conveyor systems enables a passenger who attempts to check in multiple items of baggage, and

retrieve items of baggage before they are taken away by the conveyor system in the circumstances where the passenger exceeds pre-determined limits.

It would be appreciated that as compared to other prior art systems, the exemplary arrangements discussed take up minimum additional space, while at the same time
5 providing both assisted and self check in modes. In the assisted mode, the systems associated with the self check in mode minimally intrude on the passenger experience, with the recessed scanning device hidden by the movable display on the display arm.