

## **A system and method for optimising the control of an aircraft at an airport**

### **Field**

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The present invention relates to a system and method for optimising the control of an aircraft at an airport. The present invention more particularly relates to a system and method for optimising the control of an aircraft to manage seamless connectivity of passengers and baggage of a connecting flight at an airport.

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### **Background**

The control and management of aircraft at an airport is technically very challenging and depends on many different variables. It can be difficult for an airport ground operations decision maker to keep track of the many aircraft and passengers (and their accompanying baggage transported separately) which typically travel through an airport every day.

One particular challenge, which is faced routinely by an airport ground operations decision maker, is in deciding whether to instruct the aircraft of a connecting flight to wait or to not wait for passengers and their baggage which are scheduled to transfer to the aircraft from another flight.

Figure 1 of the accompanying drawings illustrates the effect of a decision to delay a connecting Flight B which is waiting at Station 2 for passengers from a Flight A arriving at Station 1. A decision maker, such as a duty terminal manager, prior to taking a commercial decision to wait for passengers on an arriving Flight A and connecting to departure Flight B, must have a clear understanding of the impact of connecting passengers arriving on the return

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sector flight (Flight B returning to Station 2 as Flight C) if the outgoing Flight B is delayed as a result of the decision to wait.

5 It can therefore be difficult for a duty terminal manager to decide whether or not to make a connecting flight wait or not wait for connecting passengers due to the many different factors involved in such a decision. For example, the decision will depend on the number of connecting passengers, the number of bags, passenger class, departure flight turnaround times, airport and airspace curfews, re-booking availability and hotel availability. Furthermore, the duty  
10 terminal manager must, at the same time, manage conflicting objectives, such as on-time performance for flights, passenger satisfaction and minimising costs.

There is a need for an improved system and method for controlling an aircraft  
15 at an airport to alleviate at least some of the problems described above.

### **Summary**

The present invention seeks to provide an improved method and system for  
20 optimising the control of an aircraft at an airport.

According to one aspect of the present invention, there is provided a system for optimising the control of an aircraft at an airport, the system comprising: a state store module which is configured to store flight schedule data for the  
25 aircraft; a connection management module which is coupled for communication with the state store module, the connection management module being configured to receive and process: aircraft status data which is indicative of the current status of the aircraft; and connection data which is indicative of at least a time of transfer of a passenger and/or baggage from a  
30 previous aircraft to the aircraft, wherein the connection management module is configured to compare the flight schedule data with the aircraft status data and

- the connection data and to calculate, based on the comparison, a connection indicator which indicates the likelihood of a passenger and/or baggage transferring from the previous aircraft to the aircraft within a predetermined minimum connection time, wherein the system further comprises:
- 5 a recommendation module which is configured to generate, based on the connection indicator, a recommendation output message to control the aircraft to: wait for a passenger and/or baggage to transfer from the previous aircraft to the aircraft, or not to wait for a passenger and/or baggage which is scheduled to transfer from the previous aircraft to the aircraft.
  - 10 Preferably, the connection management module is further configured to receive and process: historical variable data which is indicative of at least one variable which historically affected the time taken for a passenger and/or baggage to transfer from one aircraft to another aircraft at the airport.
  - 15 Conveniently, the historical variable data comprises: at least one of historical flight departure data, historical flight boarding data, historical flight connection data, historical baggage transfer time data and/or historical data indicative of travel time between gates.
  - 20 Advantageously, the aircraft status data comprises: at least one or more of real-time flight schedule updates from air traffic control, on-demand information provided by airlines and/or flight status updates.
  - 25 Preferably, the connection management module is further configured to receive and process: constraints data which is indicative of one or more of an aircraft turnaround time, a change in gate availability, an airport curfew, seat availability, hotel room availability and/or passenger requirements.
  - 30 Conveniently, the connection management module is configured to generate the connection indicator based at least in part on the constraints data.

Advantageously, the connection management module is further configured to receive and process: consequence data which is indicative of a future consequence which is affected by the control of the aircraft to wait or to not wait for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

Preferably, the consequence data is indicative of the impact on future flights resulting from a delay due to the aircraft waiting for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

Conveniently, the consequence data is indicative of the number of hotel rooms and/or meal vouchers which would be required as a consequence of not waiting for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

Advantageously, the consequence data is indicative of the number of tickets that must be re-booked due to the aircraft not waiting for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

Preferably, the consequence data is indicative of a delay caused to a return leg of the aircraft due to the aircraft waiting for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

Conveniently, the recommendation module is configured to output a plurality of recommendation output messages to a user such that the user can accept or reject one or more of the recommendation output messages to control the aircraft to wait or to not wait for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

Advantageously, the system further comprises a display module which is configured to display information comprising at least the recommendation output message to a user.

5 According to another aspect of the present invention, there is provided a method for optimising the control of an aircraft at an airport, the method comprising: storing flight schedule data for the aircraft; receiving and processing: aircraft status data which is indicative of the current status of the aircraft; and connection data which is indicative of at least a time of transfer of  
10 a passenger and/or baggage from a previous aircraft to the aircraft; comparing the flight schedule data with the aircraft status data and the connection data; calculating, based on the comparison, a connection indicator which indicates the likelihood of a passenger and/or baggage transferring from the previous aircraft to the aircraft within a predetermined minimum connection time;  
15 generating, based on the connection indicator, a recommendation output message to control the aircraft to: wait for a passenger and/or baggage to transfer from the previous aircraft to the aircraft, or not to wait for a passenger and/or baggage which is scheduled to transfer from the previous aircraft to the aircraft.

20 Preferably, the method further comprises: receiving and processing historical variable data which is indicative of at least one variable which historically affected the time taken for a passenger and/or baggage to transfer from one aircraft to another aircraft at the airport.

25 Conveniently, the historical variable data comprises: at least one of historical flight departure data, historical flight boarding data, historical flight connection data, historical baggage transfer time data and/or historical data indicative of travel time between gates.

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Advantageously, the aircraft status data comprises: at least one or more of real-time flight schedule updates from air traffic control, on-demand information provided by airlines and/or flight status updates.

- 5 Preferably, the method further comprises: receiving and processing constraints data which is indicative of one or more of an aircraft turnaround time, a change in gate availability, an airport curfew, seat availability, hotel room availability and/or passenger requirements.
- 10 Conveniently, the method further comprises: generating the connection indicator based at least in part on the constraints data.

- Advantageously, the method further comprises: receiving and processing consequence data which is indicative of a future consequence which is  
15 affected by the control of the aircraft to wait or to not wait for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

- Preferably, the consequence data is indicative of the impact on future flights resulting from a delay due to the aircraft waiting for a passenger and/or  
20 baggage to transfer to the aircraft from a previous aircraft.

- Conveniently, the consequence data is indicative of the number of hotel rooms and/or meal vouchers which would be required as a consequence of the aircraft not waiting for a passenger and/or baggage to transfer to the aircraft  
25 from a previous aircraft.

- Advantageously, the consequence data is indicative of the number of tickets that must be re-booked due the aircraft not waiting for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

Preferably, the consequence data is indicative of a delay caused to a return leg of the aircraft due to the aircraft waiting for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

- 5 Conveniently, the method further comprises: outputting a plurality of recommendation output messages to a user such that the user can accept or reject one or more of the recommendation output messages to control the aircraft to wait or to not wait for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

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Advantageously, the method further comprises: displaying information comprising at least the recommendation output message to a user.

- 15 According to another aspect of the present invention, there is provided a computer program having instructions which, when executed by a computing device or system, cause the computing device or system to perform the method of any one of claims 14 to 26 as defined hereinafter.

- 20 According to another aspect of the present invention, there is provided a computer readable medium storing a computer program having instructions which, when executed by a computing device or system, cause the computing device or system to perform the method of any one of claims 14 to 26 as defined hereinafter.

## 25 **Brief description of the drawings**

So that the present invention may be more readily understood, embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

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Figure 1 is a schematic diagram illustrating the effect of a delay to a connecting flight,

Figure 2 is a schematic diagram showing an example implementation of a  
5 system of some embodiments, and

Figure 3 is a flow diagram illustrating the operation of a system and method of some embodiments.

## 10 Detailed description

Referring initially to figure 2 of the accompanying drawings, a system 1 of some embodiments comprises a central control unit 2 which incorporates at least a processor and a memory. The central control unit 2 is coupled to a  
15 display screen 3 which is configured to display information provided by the central control unit 2. The central control unit 2 and the display 3 are configured to be operated by a user 4 who may be a ground operations manager or a duty terminal manager at an airport.

20 In some embodiments, the central control unit 2 is a computing device which is configured to be controlled directly by the user. In other embodiments, the central control unit is a server or other computing device which is remote from the user 4 and which is controlled by the user 4 via a control terminal.

25 In this example, the central control unit 2 is coupled for communication with a database 5 which stores data to be processed by the central control unit 2. In some embodiments, the database 5 is a local server, a remote server or a server provided in a cloud computing network.

30 The central control unit 2 is further coupled for communication with a communication module 6 which provides wired and/or wireless communication

functionality to enable the central control unit 2 to communicate with other systems and devices. In this example, the communication module 6 is configured to communicate with the cloud 7 such that the communication module 6 may send and receive data from remote devices or servers, such as  
 5 via the Internet.

The communication module 6 is further configured to communicate by a wired or wireless connection with other devices and/or systems within an airport. For instance, the communication module 6 is configured to communicate with  
 10 a control centre system in an airport such as the airline's ground station or the airport's Air Traffic Control to control the aircraft 8. In some embodiments, the communication module 6 is configured to communicate with a mobile device to provide instructions to a user of the mobile device.

15 The operation of the system 1 and a method of controlling an aircraft will now be described with reference to figure 3 of the accompanying drawings.

The system of some embodiments comprises a data resource 9 which comprises at least some of the components shown on the left side of the  
 20 dotted line in figure 3. The system 1 further comprises a control platform 10 which comprises at least some of the components shown on the right-hand side of the dotted line in figure 3.

The data resource 9 comprises a central data store 11 which is configured to  
 25 store flight data.

In some embodiments, the central data store 11 is configured to store real-time flight schedule updates from airlines, airport operators and/or aviation authorities including, but not limited to, flight schedule and status changes and  
 30 Estimated In Block Time (EIBT) / Actual In Block Time (AIBT) / Scheduled Off Block Time (SOBT) / Actual Off Block Time AOBT updates for airlines.

In some embodiments, the central data store 11 is configured to store on-demand data provided by airlines. This on-demand data includes one or more of data indicating the connections for given incoming flights (boarded versus  
5 booked passengers), block times and schedule flight times, seat availability for given destinations or boarding summaries for departures (passenger connections and baggage tracking).

In some embodiments, the central data store 11 is configured to store  
10 historical data including, but not limited to, historical flight departure/boarding data, historical flight connection data, historical baggage transfer time data and/or historical data indicative of travel time between gates.

In some embodiments, the central data store 11 is configured to receive flight  
15 schedules and time estimates from an external flight schedule and time estimate module 12.

In some embodiments, the central data store 11 is configured to receive passenger reservation, check-in and boarding information from airlines via an  
20 external airline reservation and departure control system module 13.

In further embodiments, the central data store 11 is configured to receive baggage loading information from an external baggage reconciliation system  
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In some embodiments, the central data store 11 is configured to store system logs 15. The system logs 15 provide information including, but not limited to, missed connections, suggested recommendations or actions taken.

30 As will become clear from the description below, the data resource 9 is configured to communicate data stored in the central data store 11 to the

control platform 10 and to store data in the central data store 11 which is received from the control platform 10.

5 The control platform 10 comprises a state store module 16 which is configured to store flight schedule data for the aircraft 8. The following description will describe embodiments of the invention in terms of the aircraft 8 but it is to be appreciated that the system is configured to operate with any aircraft or a plurality of aircrafts.

10 The control platform 10 comprises a connection management module 17 which is coupled for communication with the state store module 16. The connection management module 17 is configured to receive and process aircraft status data provided by an aircraft status data module 18. The aircraft status data provides data which is indicative of the current status of the  
15 aircraft 8. The aircraft status data is preferably generated by the aircraft status data module 18 based on real-time updates provided by the central data store 11 of the data resource 9.

In some embodiments, the connection management module 17 is configured  
20 to receive timed triggers for airborne flights from a timed trigger module 19 and/or on-demand refresh requests from a refresh request module 20.

The control platform 10 further comprises a data input module 21 which is configured to receive and/or ingest data provided by a flight schedule  
25 module 22. In some embodiments, the data input module 21 is configured to receive a manual constraints data via data module 23, such as, but not limited to, an airport curfew (e.g. time periods during which aircraft operations are restricted), Air Traffic Flow Management (ATFM) systems such as BOBCAT (Bay of Bengal Cooperative ATFM), NOTAMs (notices to airmen issued by  
30 aviation authorities highlighted potential hazards along certain routes), gate availability, security screening of passengers from selected arrival flights.

In some embodiments the data input module 21 is configured to receive data from reference data sources 24 such as, but not limited to, airline gate/terminal assignment, container trip timings, aircraft stand comp, minimum ground time  
5 or hotel availability.

In some embodiments, the data input module 21 is configured to receive data via a representational state transfer (REST) application programming interface (API) and to provide the ingested data to the state store module 16.

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Returning now to the connection management module 17, the connection management module 17 is configured to receive and process connection data 25 which is provided by the central data store 11 of the data resource 9. The connection data 25 is indicative of at least a time of transfer of a  
15 passenger and/or baggage from a previous aircraft to the aircraft 8. In some embodiments, the connection data 25 is provided by the data resource 9 in the form of a connection graph.

The connection management module 17 is configured to compare flight  
20 schedule data from the state store module 16 with the aircraft status data provided by the aircraft status data module 18 and the connection data 25. The connection management module 17 is configured to calculate the estimated connecting time (ECT) (the estimated time that a passenger and/or accompanying baggage has in order to transfer from the previous aircraft to  
25 the aircraft 8, based on predetermined assumptions and variables), and which is further adjusted based on the comparison of flight schedule data (SIBT of the previous aircraft, and SOBT of the aircraft 8) against aircraft status data (EIBT/AIBT of the previous aircraft, and SOBT/EOBT of the aircraft 8). The connection management module 17 is further configured a connection  
30 indicator which indicates the likelihood of ECT being within a predetermined minimum connection time (MCT).

In some embodiments, the connection management module 17 is configured to calculate the ECT by adding together a predetermined waiting time for each passenger that is transferring. In some embodiments, the ECT is calculated  
 5 by adding together a first predetermined waiting time (e.g. 15 minutes) for a first portion of passengers that are transferring (e.g. the first five passengers) and adding together a second predetermined waiting time (e.g. 1 minute) for each remaining transferring passenger.

10 In some embodiments, the connection management module 17 is configured to provide an output to a constraints module 26. The constraints module 26 is configured to retrieve constraints data from the data resource 9. The constraints data comprises at least one of aircraft turnaround, a change in gate availability, an airport curfew, ATFM considerations, weather disruptions, seat  
 15 availability, hotel room availability, VIP/passengers with reduced mobility information or other passenger requirements.

The control platform 10 further comprises a recommendation module 27 which is configured to generate, based on the connection indicator generated by the  
 20 connection management module 17, a recommendation output message to control the aircraft 8. The recommendation output message controls the aircraft 8 to either wait for a passenger and/or baggage to transfer from a previous aircraft to the aircraft 8 or to not wait for a passenger and/or baggage which is scheduled to transfer from the previous aircraft to the aircraft 8.

25 The recommendation module 27 provides the recommendation output message via the state store module 16 to an output module 28. The output module 28 provides the recommendation output message to a user and/or directly to the aircraft 8's ground station or the airport's Air Traffic Control. In  
 30 some embodiments, the system is configured to display the recommendation output message to a user via the display 3. In further embodiments the

system is configured to output a plurality of recommendation output messages to a user such that the user can accept or reject one or more of the recommendation output messages to control the aircraft 8 to wait or to not wait for a passenger and/or baggage to transfer to the aircraft 8 from a previous aircraft.

In some embodiments, the connection management module 17 is further configured to receive and process consequence data which is indicative of a future consequence which is affected by the control of the aircraft to wait or to not wait for a passenger and/or baggage to transfer to the aircraft 8 from a previous aircraft. In some embodiments, the consequence data is indicative of the impact on future flights resulting from a delay due to the aircraft 8 waiting for a passenger and/or baggage to transfer to the aircraft 8 from a previous aircraft. In some embodiments, the consequence data is indicative of the number of hotel rooms and/or meal vouchers which would be required as a consequence of a delay caused by the aircraft waiting for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

In some embodiments, the consequence data is indicative of the number of tickets that must be re-booked due to a delay caused by the aircraft waiting for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

In some embodiments, the consequence data is indicative of a delay caused to a return leg of the aircraft due to the aircraft waiting for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

The system and method of some embodiments optimises the control of an aircraft at an airport by minimising the impact due to a delay caused by an aircraft waiting for a passenger and/or baggage to transfer to the aircraft from a previous flight. The system is configured to harness the power of machine learning and artificial intelligence to analyse vast quantities of data for aircraft,

passengers and baggage in order to provide an informed data driven recommendation output message to control an aircraft. It is simply not possible for a human to perform this level of complex data analysis, even using conventional computing devices and data records.

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The system also provides flexibility in that some embodiments are configured to provide a list of possible recommendation output messages to enable a system or user to accept or reject one or more of the recommendation output messages in order to optimise the control of an aircraft at an airport.

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Although the subject matter has been described in language specific to structural features or methodological acts, it is to be understood that the subject matter of the appended claims is not necessarily limited to the specific features or acts described above. Rather, the specific features and acts described above are disclosed as example forms of implementing at least some of the claims.

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Various operations of embodiments are provided herein. The order in which some or all of the operations are described should not be construed to imply that these operations are necessarily order dependent. Alternative ordering will be appreciated having the benefit of this description. Further, it will be understood that not all operations are necessarily present in each embodiment provided herein. Also, it will be understood that not all operations are necessary in some embodiments.

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Moreover, "exemplary" is used herein to mean serving as an example, instance, illustration, etc., and not necessarily as advantageous. As used in this application, "or" is intended to mean an inclusive "or" rather than an exclusive "or". In addition, "a" and "an" as used in this application and the appended claims are generally be construed to mean "one or more" unless specified otherwise or clear from context to be directed to a singular form.

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Also, at least one of A and B and/or the like generally means A or B or both A and B. Furthermore, to the extent that "includes", "having", "has", "with", or variants thereof are used, such terms are intended to be inclusive in a manner similar to the term "comprising". Also, unless specified otherwise, "first,"  
5 "second," or the like are not intended to imply a temporal aspect, a spatial aspect, an ordering, etc. Rather, such terms are merely used as identifiers, names, etc. for features, elements, items, etc. For example, a first element and a second element generally correspond to element A and element B or two different or two identical elements or the same element.

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Also, although the disclosure has been shown and described with respect to one or more implementations, equivalent alterations and modifications will occur to others of ordinary skill in the art based upon a reading and understanding of this specification and the annexed drawings. The disclosure  
15 comprises all such modifications and alterations and is limited only by the scope of the following claims. In particular regard to the various functions performed by the above described features (e.g., elements, resources, etc.), the terms used to describe such features are intended to correspond, unless otherwise indicated, to any features which performs the specified function of  
20 the described features (e.g., that is functionally equivalent), even though not structurally equivalent to the disclosed structure. In addition, while a particular feature of the disclosure may have been disclosed with respect to only one of several implementations, such feature may be combined with one or more other features of the other implementations as may be desired and  
25 advantageous for any given or particular application.

Embodiments of the subject matter and the functional operations described herein can be implemented in digital electronic circuitry, or in computer software, firmware, or hardware, including the structures disclosed in this  
30 specification and their structural equivalents, or in combinations of one or more of them.

Some embodiments are implemented using one or more modules of computer program instructions encoded on a computer-readable medium for execution by, or to control the operation of, a data processing apparatus. The computer-readable medium can be a manufactured product, such as hard drive in a computer system or an embedded system. The computer-readable medium can be acquired separately and later encoded with the one or more modules of computer program instructions, such as by delivery of the one or more modules of computer program instructions over a wired or wireless network.

5     The computer-readable medium can be a machine-readable storage device, a machine-readable storage substrate, a memory device, or a combination of one or more of them.

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The terms “computing device” and “data processing apparatus” encompass all apparatus, devices, and machines for processing data, including by way of example a programmable processor, a computer, or multiple processors or computers. The apparatus can include, in addition to hardware, code that creates an execution environment for the computer program in question, e.g., code that constitutes processor firmware, a protocol stack, a database management system, an operating system, a runtime environment, or a combination of one or more of them. In addition, the apparatus can employ various different computing model infrastructures, such as web services, distributed computing and grid computing infrastructures.

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25    The processes and logic flows described in this specification can be performed by one or more programmable processors executing one or more computer programs to perform functions by operating on input data and generating output.

30    Processors suitable for the execution of a computer program include, by way of example, both general and special purpose microprocessors, and any one

or more processors of any kind of digital computer. Generally, a processor will receive instructions and data from a read-only memory or a random access memory or both. The essential elements of a computer are a processor for performing instructions and one or more memory devices for storing  
5 instructions and data. Generally, a computer will also include, or be operatively coupled to receive data from or transfer data to, or both, one or more mass storage devices for storing data, e.g., magnetic, magneto-optical disks, or optical disks. However, a computer need not have such devices. Devices suitable for storing computer program instructions and data include all  
10 forms of non-volatile memory, media and memory devices, including by way of example semiconductor memory devices, e.g., EPROM (Erasable Programmable Read-Only Memory), EEPROM (Electrically Erasable Programmable Read-Only Memory), and flash memory devices; magnetic disks, e.g., internal hard disks or removable disks; magneto-optical disks; and  
15 CD-ROM and DVD-ROM disks.

To provide for interaction with a user, some embodiments are implemented on a computer having a display device, e.g., a CRT (cathode ray tube) or LCD (liquid crystal display) monitor, for displaying information to the user and a  
20 keyboard and a pointing device, e.g., a mouse or a trackball, by which the user can provide input to the computer. Other kinds of devices can be used to provide for interaction with a user as well; for example, feedback provided to the user can be any form of sensory feedback, e.g., visual feedback, auditory feedback, or tactile feedback; and input from the user can be received in any  
25 form, including acoustic, speech, or tactile input.

The computing system can include clients and servers. A client and server are generally remote from each other and typically interact through a communication network. The relationship of client and server arises by virtue  
30 of computer programs running on the respective computers and having a client-server relationship to each other. Embodiments of the subject matter

described in this specification can be implemented in a computing system that includes a back-end component, e.g., as a data server, or that includes a middleware component, e.g., an application server, or that includes a front-end component, e.g., a client computer having a graphical user interface or a Web browser through which a user can interact with an implementation of the subject matter described is this specification, or any combination of one or more such back-end, middleware, or front-end components. The components of the system can be interconnected by any form or medium of digital data communication, e.g., a communication network. Examples of communication networks include a local area network ("LAN") and a wide area network ("WAN"), an inter-network (e.g., the Internet), and peer-to-peer networks (e.g., ad hoc peer-to-peer networks).

In the present specification "comprise" means "includes or consists of" and "comprising" means "including or consisting of".

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

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**CLAIMS**

1. A system for optimising the control of an aircraft at an airport, the system comprising:

5 a state store module which is configured to store flight schedule data for the aircraft;

a connection management module which is coupled for communication with the state store module, the connection management module being configured to receive and process:

10 aircraft status data which is indicative of the current status of the aircraft; and

connection data which is indicative of at least a time of transfer of a passenger and/or baggage from a previous aircraft to the aircraft, wherein the connection management module is configured to compare  
15 the flight schedule data with the aircraft status data and the connection data and to calculate, based on the comparison, a connection indicator which indicates the likelihood of a passenger and/or baggage transferring from the previous aircraft to the aircraft within a predetermined minimum connection time, wherein the system further  
20 comprises:

a recommendation module which is configured to generate, based on the connection indicator, a recommendation output message to control the aircraft to:

25 wait for a passenger and/or baggage to transfer from the previous aircraft to the aircraft, or

not to wait for a passenger and/or baggage which is scheduled to transfer from the previous aircraft to the aircraft.

2. The system of claim 1, wherein the connection management module is  
30 further configured to receive and process:

historical variable data which is indicative of at least one variable which historically affected the time taken for a passenger and/or baggage to transfer from one aircraft to another aircraft at the airport.

5     3.     The system of claim 2, wherein the historical variable data comprises:  
            at least one of historical flight departure data, historical flight boarding  
            data, historical flight connection data, historical baggage transfer time data  
            and/or historical data indicative of travel time between gates.

10    4.     The system of any one of the preceding claims, wherein the aircraft  
            status data comprises:  
            at least one or more of real-time flight schedule updates from air traffic  
            control, on-demand information provided by airlines and/or flight status  
            updates.

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5.     The system of any one of the preceding claims, wherein the connection  
            management module is further configured to receive and process:  
            constraints data which is indicative of one or more of an aircraft  
            turnaround time, a change in gate availability, an airport curfew, seat  
20     availability, hotel room availability and/or passenger requirements.

6.     The system of claim 5, wherein the connection management module is  
            configured to generate the connection indicator based at least in part on the  
            constraints data.

25

7.     The system of any one of the preceding claims, wherein the connection  
            management module is further configured to receive and process:  
            consequence data which is indicative of a future consequence which is  
            affected by the control of the aircraft to wait or to not wait for a passenger  
30     and/or baggage to transfer to the aircraft from a previous aircraft.

8. The system of claim 7, wherein the consequence data is indicative of the impact on future flights resulting from a delay due to the aircraft waiting for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

5 9. The system of claim 7 or claim 8, wherein the consequence data is indicative of the number of hotel rooms and/or meal vouchers which would be required as a consequence of not waiting for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

10 10. The system of any one of claims 7 to 9, wherein the consequence data is indicative of the number of tickets that must be re-booked due to the aircraft not waiting for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

15 11. The system of any one of claims 7 to 10, wherein the consequence data is indicative of a delay caused to a return leg of the aircraft due to the aircraft waiting for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

20 12. The system of any one of the preceding claims, wherein the recommendation module is configured to output a plurality of recommendation output messages to a user such that the user can accept or reject one or more of the recommendation output messages to control the aircraft to wait or to not wait for a passenger and/or baggage to transfer to the aircraft from a previous  
25 aircraft.

13. The system of any one of the preceding claims, wherein the system further comprises a display module which is configured to display information comprising at least the recommendation output message to a user.

14. A method for optimising the control of an aircraft at an airport, the method comprising:

storing flight schedule data for the aircraft;

receiving and processing:

5 aircraft status data which is indicative of the current status of the aircraft; and

connection data which is indicative of at least a time of transfer of a passenger and/or baggage from a previous aircraft to the aircraft;

10 comparing the flight schedule data with the aircraft status data and the connection data;

calculating, based on the comparison, a connection indicator which indicates the likelihood of a passenger and/or baggage transferring from the previous aircraft to the aircraft within a predetermined minimum connection  
15 time;

generating, based on the connection indicator, a recommendation output message to control the aircraft to:

wait for a passenger and/or baggage to transfer from the previous aircraft to the aircraft, or

20 not to wait for a passenger and/or baggage which is scheduled to transfer from the previous aircraft to the aircraft.

15. The method of claim 14, wherein the method further comprises:

25 receiving and processing historical variable data which is indicative of at least one variable which historically affected the time taken for a passenger and/or baggage to transfer from one aircraft to another aircraft at the airport.

16. The method of claim 15, wherein the historical variable data comprises:

30 at least one of historical flight departure data, historical flight boarding data, historical flight connection data, historical baggage transfer time data and/or historical data indicative of travel time between gates.

17. The method of any one of claims 14 to 16, wherein the aircraft status data comprises:

5 at least one or more of real-time flight schedule updates from air traffic control, on-demand information provided by airlines and/or flight status updates.

18. The method of any one of claims 14 to 17, wherein the method further comprises:

10 receiving and processing constraints data which is indicative of one or more of an aircraft turnaround time, a change in gate availability, an airport curfew, seat availability, hotel room availability and/or passenger requirements.

15 19. The method of claim 18, wherein the method further comprises:

generating the connection indicator based at least in part on the constraints data.

20 20. The method of any one of claims 14 to 19, wherein the method further comprises:

receiving and processing consequence data which is indicative of a future consequence which is affected by the control of the aircraft to wait or to not wait for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

25

21. The method of claim 20, wherein the consequence data is indicative of the impact on future flights resulting from a delay due to the aircraft waiting for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

30 22. The method of claim 20 or claim 21, wherein the consequence data is indicative of the number of hotel rooms and/or meal vouchers which would be

required as a consequence of the aircraft not waiting for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

23. The method of any one of claims 20 to 22, wherein the consequence  
5 data is indicative of the number of tickets that must be re-booked due the aircraft not waiting for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

24. The method of any one of claims 20 to 23, wherein the consequence  
10 data is indicative of a delay caused to a return leg of the aircraft due to the aircraft waiting for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

25. The method of any one of claims 14 to 24, wherein the method further  
15 comprises:  
outputting a plurality of recommendation output messages to a user such that the user can accept or reject one or more of the recommendation output messages to control the aircraft to wait or to not wait for a passenger and/or baggage to transfer to the aircraft from a previous aircraft.

20  
26. The method of any one of claims 14 to 25, wherein the method further comprises:  
displaying information comprising at least the recommendation output message to a user.

25  
27. A computer program having instructions which, when executed by a computing device or system, cause the computing device or system to perform the method of any one of claims 14 to 26.

30  
28. A computer readable medium storing a computer program having instructions which, when executed by a computing device or system, cause

the computing device or system to perform the method of any one of claims 14 to 26.