Title: SYSTEM AND BUSINESS METHOD FOR OFFERING SEAT UPGRADES TO PATRONS AT A PUBLIC FACILITY

Abstract: A virtual ticket control system for upgrading tickets of customers to a public facility. The virtual ticket control system comprises: 1) a plurality of access points disposed throughout the public facility, each of the access points establishing a communication link to at least one of a plurality of virtual ticket devices used by customers and receiving at least one virtual ticket transmitted by the at least one virtual ticket device; 2) a memory for storing a seating database identifying empty seats in the public facility and occupied seats in the public facility; and 3) a ticket upgrade controller coupled to the plurality of access points and the memory and capable of receiving a first virtual ticket from a first one of the plurality of virtual ticket devices. The ticket upgrade controller compares a location of a first seat associated with the first virtual ticket with the seating database and identifies a first empty seat having a more desirable location than the first seat location. The ticket upgrade controller generates a ticket upgrade offer message associated with the first empty seat and transmits the ticket upgrade offer message to the first virtual ticket device.
System and business method for offering seat upgrades to patrons at a public facility

The present invention is related to those disclosed in the following United States Applications:

1. Serial No. 09/971,230 (Docket no. US010493), filed concurrently herewith, entitled “SELLING BEST AVAILABLE SEATS AT A PUBLIC FACILITY”;

2. Serial No. 09/971,229 (Docket no. US010494), filed concurrently herewith, entitled “SYSTEM FOR DISPLAYING PERSONAL MESSAGES AT A PUBLIC FACILITY AND METHOD OF DOING BUSINESS”; 

3. Serial No. 09/971,141 (Docket no. US010496), filed concurrently herewith, entitled “BUSINESS METHOD AND SYSTEM FOR COMMUNICATING PUBLIC-FACILITY STATUS INFORMATION THROUGH A VIRTUAL TICKET DEVICE”;

4. Serial No. 09/970,910 (Docket no. US010497), filed concurrently herewith, entitled “TICKET EXCHANGE SYSTEM AND METHOD OF OPERATION”;

5. Serial No.09/971,128 (Docket no. US010498), filed concurrently herewith, entitled “PUBLIC VENUE AUCTION SYSTEM AND METHOD OF OPERATION”;

6. Serial No. 09/971,143 (Docket no. US010499), filed concurrently herewith, entitled “SYSTEM AND METHOD FOR SELLING GOODS TO CUSTOMERS OF A PUBLIC FACILITY”; and

7. Serial No. 09/970,891 (Docket no. US010500), filed concurrently herewith, entitled “SYSTEM AND METHOD FOR SELLING IMAGE DISPLAY TIME TO CUSTOMERS OF A PUBLIC FACILITY”.

The above applications are commonly assigned to the assignee of the present invention. The disclosures of these related patent applications are hereby incorporated by reference for all purposes as if fully set forth herein.

The present invention is directed to electronic ticket control systems and, more specifically, to a systems and methods for offering seat upgrades to patrons at a large public venue.

Large public entertainment facilities, such as convention centers, concert halls, stadiums, sports arenas, and the like, are the civic centers of many communities and are important sources of revenue and employment. Quite often, public facilities are funded by
taxpayers in order to attract or at least retain sports franchises, and to attract tourists and conventions. The large sums invested in public entertainment facilities make it essential to maximize the revenue derived from such facilities and to minimize their operating costs.

However, large public facilities tend to be labor intensive operations. A typical sports facility requires a large number of gate attendants, ticket agents, ushers, concession stand operators, shop vendors, and security officers, and the like. Many new sports facilities also employ waiters and waitresses who take orders from, and serve food and drink to, customers at their seats. Facility operators use labor-saving technology wherever possible in order to offset the high labor costs associated with large public facilities.

In addition to cutting costs, facility operators also try to increase revenue in different ways. The principle sources of revenue are ticket sales, concession stands, and vendor shops. Promotions are frequently offered in order to increase sales and many public facilities do not permit patrons to bring their own food and drink into the venues. And facility operators are increasingly seeking new technology to provide new and enjoyable services to customers and thereby increase attendance and revenue.

There is therefore a need in the art for technical improvements that reduce the costs of operating large public entertainment facilities. In particular, there is a need for new technologies that help to reduce labor costs associated with a operating large public facilities. Additionally, there is a need for technical improvements that enhance the revenues of large public facilities. More particularly, there is a need for new technologies that provide useful and enjoyable services to the patrons of large public facilities.

To address the above-discussed deficiencies of the prior art, there is provided a portable computer system (hereafter a “virtual ticket device”) that delivers virtual tickets for sports events, theater, concerts, and the like, together with various services and methods of doing business which are linked to and implemented through the virtual ticket device.

In its simplest form, the virtual ticket device is an existing smart telephone or cellular communication-enabled personal digital assistant (PDA), such as a PALM PILOT™ or a VISOR™ electronic organizer, a portable video game controller or a portable personal computer. A dedicated virtual ticket device could also be used. A customer who wishes to attend an event purchases admission in any conventional manner (e.g., by telephone from a ticket service, in person at a box office, via the Internet). The ticket vendor sends an encrypted admission authorization record over a wireless channel or a wireline channel to the virtual ticket device, where it is stored as a virtual electronic ticket.
It will be recognized that the virtual ticket device serves multiple functions to
its user. There are clear synergies between many of these functions; for example the
communications functions of the device may be enhanced when the customers seat location
and entry time are known and stored in the system. Nevertheless many aspects of the present
invention remain new and useful even when the customer is admitted to the facility with a
paper ticket or in another conventional manner and for this reason, the term "virtual ticket
device" as used in this patent specification and the claims which follow, is not limited or
restricted to a device which is actually used or even programmed to authorize a customer's
admission to the facility.

The encrypted admission authorization record may include, for example,
information which identifies the date and location of the event, the seat number, price paid,
and the like. The encrypted admission authorization record also may include uniquely
encrypted information which may be used in a conventional manner to authenticate that the
record is genuine. The same information is preferably stored in a central database which is
accessible by the event operator and/or his service provider. The record in the database
should preferably also include the telephone number or wireless address of the virtual ticket
device so that contact with the virtual ticket device may be established at a later time.

Entry point terminals are provided at the entrances of the public facility which
read at least the encrypted authentication information from the virtual ticket device and
authorize the customer to enter the event. The entry point terminals read the authentication
information over a very short range wireless (RF) channel or infrared (IR) channel, or via a
dedicated interface slot coupled to a wireline channel to prevent eavesdropping and spoofing
of the process. For example, the virtual ticket device may be programmed to display the data
either as a string of characters (e.g., serial number) or a bar code on its LCD display and the
displayed information can be optically scanned in a chamber of the entry point terminal.

Preferably both the virtual ticket device and the arena or theater is also
equipped with hardware and software which can track the location of the virtual ticket device
in and around the facility with a precision of perhaps a few meters. Once the customer has
purchased a virtual ticket, the virtual ticket device can be used, in conjunction with
information stored in the database, to provide a number of distinct information and marketing
services to the customer.

Among these services is a seat upgrade service that offers customers better
seats at the public facility. According to the principles of the present invention, a seat
upgrade (or ticket upgrade) system associated with the public facility determines the
locations of empty seats in the public facility and identifies target customers occupying seats that are less desirable than the empty seats. The less desirable seats may be further away from the playing area or stage of the public facility or may have a partially obstructed view. The seat upgrade system then transmits electronic seat upgrade offers to the virtual ticket devices used by the target customers. The ticket/seat upgrades may be offered free as a courtesy to the customers. However, in an advantageous embodiment, the upgraded tickets are offered for an additional premium, thereby increasing the revenues of the public facility. In order to increase the incentive to the customer to upgrade his or her seat, the seat upgrade system may transmit to the virtual ticket device one or more images of the view(s) of the public facility from the upgraded seat. This may help to spur impulse buying (or upgrading) by the customer.

Accordingly, it is a primary object of the present invention to provide a virtual ticket control system for upgrading tickets of customers to a public facility. According to an advantageous embodiment of the present invention, the virtual ticket control system comprises: 1) a plurality of access points capable of being disposed throughout the public facility, each of the access points capable of establishing a communication link to at least one of a plurality of virtual ticket devices used by customers and receiving at least one virtual ticket transmitted by the at least one virtual ticket device; 2) a memory capable of storing a seating database identifying empty seats in the public facility and occupied seats in the public facility; and 3) a ticket upgrade controller coupled to the plurality of access points and the memory and capable of receiving a first virtual ticket from a first one of the plurality of virtual ticket devices, wherein the ticket upgrade controller compares a location of a first seat associated with the first virtual ticket with the seating database and identifies a first empty seat having a more desirable location than the first seat location and wherein the ticket upgrade controller generates a ticket upgrade offer message associated with the first empty seat and transmits the ticket upgrade offer message to the first virtual ticket device.

According to one embodiment of the present invention, the ticket upgrade offer message comprises an image data file showing a view from the first empty seat.

According to another embodiment of the present invention, the ticket upgrade offer message comprises a premium price associated with the first empty seat.

According to still another embodiment of the present invention, the virtual ticket control system further comprises a location determination apparatus capable of determining the first seat location.
According to yet another embodiment of the present invention, the location determination apparatus determines the first seat location from seat data information associated with the first virtual ticket.

In one embodiment of the present invention, the ticket upgrade controller determines at least a second seat location associated with the first virtual ticket and identifies at least a second empty seat associated with the first empty seat.

In another embodiment of the present invention, the ticket upgrade offer message comprises upgrade information related to the second empty seat.

Fig. 1 is a plan diagram of a public facility in which an electronic ticket control system according to the principles of the present invention may be deployed;

Fig. 2 illustrates a virtual ticket device which is capable of interacting with an electronic ticket control system according to the principles of the present invention;

Fig. 3 illustrates a virtual electronic ticket displayed on the virtual ticket device in Fig. 2 according to one embodiment of the present invention;

Fig. 4 illustrates an electronic ticket control system according to one embodiment of the present invention;

Fig. 5 is a flow diagram illustrating the operation of the electronic ticket control system and the virtual ticket device according to one embodiment of the present invention;

Fig. 6 illustrates portions of the electronic ticket control system that offers seat upgrades to patrons of the exemplary public facility according to one embodiment of the present invention; and

Fig. 7 is a flow diagram illustrating a ticket upgrading operation of the exemplary electronic ticket control system and the exemplary portable virtual ticket device according to one embodiment of the present invention.

Figs. 1 through 7, discussed below, and the various embodiments used to describe the principles of the present invention in this patent document are by way of illustration only and should not be construed in any way to limit the scope of the invention. Those skilled in the art will understand that the principles of the present invention may be
implemented in any suitably arranged communications network capable of communicating with virtual ticket devices.

Fig. 1 is a plan view of public facility 100 in which an electronic ticket control system according to the principles of the present invention may be deployed. Public facility 100 is representative of any public venue that is capable of holding a large audience. Thus, public facility 100 may include a football or baseball stadium, a basketball or hockey arena, a large concert hall, a convention center, and the like. As used herein and for the purpose of determining the scope of the claims of the present invention, the term "public facility" may include any controlled-access location to which people may be admitted by means of an electronic ticket control system and should not be construed to exclude facilities that are privately owned or that are open only to selected portions of the general public. In fact, public facility 100 may include controlled-access private clubs and private buildings, and even controlled-access forms of transportation, such as trains, planes, cruise ships, and the like. However, for the purpose of simplicity in explaining the principles of the present invention, it shall be assumed that public facility 100 is a sports facility.

Public facility 100 comprises a plurality of seating areas, including exemplary seat sections 101-110, that surround a playing area (e.g. hockey rink, basketball court, indoor track, or the like). Suspended over the playing area is multi-sided display (MSD) 120, which has large display screens on four sides. The seating areas are surrounded by an exterior promenade area that contains a plurality of concession stands (CS), including four exemplary concession stands labeled CS1, CS2, CS3 and CS4. The promenade area also includes a number of rest rooms (RR), including exemplary rest rooms labeled RR1, RR2, RR3 and RR4, and numerous vendor shops (VS), including exemplary vendor shops labeled VS1, VS2, VS3 and VS4. Finally, the promenade area contains ticket office 130, security office 140, and first aid station 150.

Electronic displays of various types are positioned throughout public facility 100. In the promenade area, displays D1, D2, D3 and D4 enable patrons at the concession stands or vendor shops, or waiting in rest room lines, to view the sporting event that is ongoing in the playing area. In the seating area, patrons can view displays D5, D6, D7 and D8, which typically display advertisements, scores of other sporting events, player statistics, audience greetings, and the like. As used herein and for the purpose of determining the scope of the claims of the present invention, displays D1-D8 may be any type of conventional display devices, including electronic signs, conventional sized television sets, large screen television sets, and multisided television displays, that generally may be viewed
by at least some of the customers of public facility 100 and do not include non-public displays which are viewed by employees of public facility 100.

For example, each one of displays D1, D2, D3 and D4 may be an elevated multisided display system having three or four sides, wherein each side contains a large screen video display. Also, in an exemplary embodiment, one or more of displays D5-D8 in the seating area may be a conventional television set that is disposed in a luxury box of public facility 100.

Each of entry point terminals EPT1, EPT2, EPT3 and EPT4 is disposed next to one of four entrance to public facility 100. EPT1, EPT2, EPT3 and EPT4 are capable of detecting and registering the virtual electronic tickets used by customers of public facility 100. EPT1-EPT4 read at least the encrypted authentication information from the virtual ticket device and authorize the customer to enter public facility 100. Each one of EPT1, EPT2, EPT3 and EPT4 registers the admission of each virtual electronic ticket by any one of several conventional technologies. For example, one or more of EPT1, EPT2, EPT3 and EPT4 may comprise an optical scanner that scans a bar code or a serial number displayed on the display of a virtual ticket device that stores each virtual electronic ticket. Alternatively, one or more of EPT1, EPT2, EPT3 and EPT4 may comprise a radio frequency transceiver that establishes an RF link (such as a Bluetooth connection), or an infrared (IR) transceiver that establishes an IR link, that transfers the virtual electronic ticket information from the virtual ticket device used by the customer to the entry point terminal. In still another embodiment, one or more of EPT1, EPT2, EPT3 and EPT4 may contain a slot or a similar hardware interface into which a virtual ticket device may be inserted or engaged in order to transfer the virtual electronic ticket information via a wireline connection.

Additionally, a number of wireless or wireline access points (APs) are distributed throughout the seating area and the promenade area of public facility 100. Exemplary access points labeled AP1-AP8 are shown in Fig. 1. According to an advantageous embodiment of the present invention, EPT1-EPT4 may function both as access points and as entry point terminals. AP1-AP8 provide communication channels that permit the virtual ticket devices used by customers to communicate with the electronic ticket control system associated with public facility 100. According to an advantageous embodiment of the present invention, AP1-AP8 are radio frequency transceivers of the base stations of a microcellular system that provide two-way radio frequency (RF) communication links with virtual ticket devices within public facility 100. Preferably, AP1-AP8 have a hand-off capability that allows a customer to roam throughout public facility 100 without losing
communication with the electronic ticket control system. Advantageously, this allows the electronic ticket control system to continually track the location of each virtual ticket device in public facility 100.

However, in alternate embodiment of the present invention, one or more of AP1-AP8 may be physical interface slots into which virtual tickets devices may be inserted. For example, each seat in public facility 100 may be provided with an interface slot (similar to an electronic cradle) that may mate with a virtual ticket device. A wireline connection to each such interface slot enables each virtual ticket device to communicate with the electronic ticket control system. Furthermore, according to an advantageous embodiment of the present invention, exterior access points may be disposed in the areas outside of public facility 100 in order to communicate with customers as they are nearing, and before they enter public facility 100. Access points, such as AP1-AP8 and EPT1-EPT4, may be used to provide a variety of user-friendly services to the patrons of public facility 100. When a customer is near, but not yet admitted to, public facility 100, the access points may transmit useful information to the virtual ticket device used by the customer, including directions to the nearest entrance, advice as to which entrance has the shortest waiting line, promotional items available at vendor shops and concession stands, and the like. After the customer has been admitted to public facility 100, the access points may provide the virtual ticket device real time directions from her present location to her assigned seat, to particular concession stands or vendor shops, to rest rooms, or to other service areas. Information on which concession and service has the shortest line can also be provided.

Using the access points, the facility operator can know in real time how many admitted customers are at their seats and may schedule the start of programs on this basis. The customer can place orders for food and promotional items via the access points using the virtual ticket device and the vendors can deliver these goods to her present location. The access points and the virtual ticket device can also be used to authenticate the identity of the customer before the goods are turned over to her.

The facility operator may use the access points to communicate information to the virtual ticket devices about available seating upgrades. These could be based on the real time location of the customer. For example, an access point may transmit to the virtual ticket device the message: “Two seats are available in the section in front of you. Would you like to move there for an additional $10?” If the virtual ticket device has capability for broadband communication and a reasonably high quality display, this could be supplemented with video
promotions, such as: "Here's what the last home run looked like from section 110. Would you like to upgrade your seat and move there?"

Customers can use their virtual ticket devices to signal their present location within public facility 100 to friends and to locate lost family members. A network of entry point terminals may be used within public facility 100 to authorize admission to various areas such as preferred seating sections, clubs, luxury boxes, reserved rest rooms, priority parking lots, and the like. Additionally, automated cameras in public facility 100 may be used to photograph the customers during an event and the photographs can later be identified with groups of virtual tickets and offered for sale to the customers. In the case of accidents or disruptions, the location information can be used to contact potential witnesses. Additionally, seating and purchase information can be used for directed post-event marketing, which can be communicated directly to the virtual ticket device.

Fig. 2 illustrates virtual ticket device 200, which is capable of interacting with an electronic ticket control system according to the principles of the present invention.

Virtual ticket device 200 comprises processor 205, memory 210, display 220, keypad 230, and one or more communication interfaces, including infrared (IR) interface (IF) 260, radio frequency (RF) interface (IF) 270, and wireline interface (IF) 280. Processor 205, memory 210, display 220, and keypad 230 are coupled to, and communicate via, system bus 240. Processor 205, memory 210, display 220, and keypad 230 are coupled to, and communicate via, input/output (I/O) bus 250.

Processor 205 controls the overall operation of virtual ticket device 200 by executing basic operating system (O/S) program 211 in memory 210. Memory 210 also stores graphical user interface (GUI) application program 212, a plurality of personal digital assistant (PDA) applications 213, downloaded venue applications 214, and downloaded venue data files 215. PDA applications 213 may include, for example, an e-mail application, a browser application, a calendar application, and the like.

In the illustrated embodiment, virtual ticket device 200 contains three external communication interfaces, namely, infrared interface 260, radio frequency interface 270, and wireline interface 280. However, not all of these external communication interfaces are necessary to the operation of the invention. For example, in an advantageous embodiment of the present invention, virtual ticket device 200 may only contain wireline interface 280 and RF interface 270. Virtual ticket device 200 may be adapted for insertion into a cradle device that plugs into wireline interface 280 and provides virtual ticket device 200 with electrical power for recharging a battery (not shown) in virtual ticket device 200. When virtual ticket device
device 200 is plugged into a cradle device, applications and data may be downloaded or uploaded via wireline interface 280.

For example, in an advantageous embodiment of the present invention, virtual ticket device 200 may be a wireless enabled electronic organizer, such as a Palm VII™ organizer. As those skilled in the art are aware, a Palm VII™ organizer (or an equivalent appliance) is capable of communicating via a wireless interface (such as RF interface 270) and may be mounted in a cradle device that provides wireline communication and power supply voltages to the organizer.

Processor 205 executes GUI application program 212 in order to interact with the operator of virtual ticket device 200 via keypad 230 and display 220. Normally, GUI application program 212 enables processor 205 to execute PDA applications 213 stored in memory 210. One of these applications may include a browser application that allows virtual ticket device 200 to access via RF interface 270 or wireline interface 280 a website for a ticket agency in order to purchase a virtual electronic ticket to an event at public facility 100. When a virtual electronic ticket is purchased in this manner, the virtual electronic ticket and other useful applications and data files may be downloaded from the ticket agency website to virtual ticket device 200 and stored in downloaded venue applications 214 and downloaded venue data file 215.

Downloaded venue data file 215 may be used to store such information as the virtual electronic ticket, electronic maps of public facility 100, text information related to concession stands and vendor shops, and text information related to security and first aid at public facility 100. Downloaded venue applications 214 may include one or more applications executed by processor 205 when the customer is at public facility 100. In particular, downloaded venue applications 214 may include a communication application that enables processor 205 to control the operation of RF interface 270 and wireline interface 280 such that virtual ticket device 200 is capable of communicating with access points AP1-AP8 and entry point terminals EPT1-EPT4 at public facility 100. For example, the communication application may configure RF interface 270 in virtual ticket device 200 to use the operating frequency channels and medium access control (MAC) layer protocols used by AP1-AP8 and EPT1-EPT4.

Fig. 3 illustrates virtual electronic ticket 350 displayed on virtual ticket device 200 according to one embodiment of the present invention. Virtual ticket device 200 comprises display 220, and keypad 230. The lower portion of display 220 contains scratch pad 305 and a plurality of icons, namely icons 11, 12, 13, and 14. The upper portion of
display 220 contains virtual electronic ticket 350. Virtual electronic ticket 350 comprises event name field 352, event date field 354, venue name field 356, seating information field 358, ticket serial number field 360, and bar code field 362.

The operator of virtual ticket device 200 may use a stylus or a similar device to select icons 11, 12, 13 or 14 and thereby launch one or more of PDA applications 213 in memory 210. Additionally, the operator may use the stylus to enter text or numbers in scratch pad area 305 when executing one of PDA applications 213 that permits the entry of text data. Additionally, the buttons in keypad 230 may be used to select icons or to perform functions such as scroll up, scroll down, scroll left, scroll right and the like.

When the customer approaches or enters public facility 100, the customer turns on virtual ticket device 200 and launches the communication application in downloaded venue applications 214 that allows virtual ticket device 200 to communicate with entry point terminals EPT1-EPT4 and access points AP1-AP8 in public facility 100. The communication application may be launched automatically simply by selecting virtual electronic ticket 350 that has been downloaded and stored in downloaded venue data files 215. Event name field 352 contains the name of the event occurring in public facility 100, such as “New York Knicks vs. Indiana Pacers.” Event date field 354 contains the date on which the event is occurring, such as “November 13, 2001.” Venue name field 356 contains the name of public facility 100, such as “Madison Square Garden.” Seating information field 358 contains the section, row and seat number information associated with virtual electronic ticket 350.

If the entry point terminal contain an optical scanner, the optical scanner may scan one or both of ticket serial number field 360 and bar code field 362. An optical character recognition application may be used to read the serial number appearing in ticket serial number field 360. A conventional bar code scanner device may read the bar code in bar code field 362. In either event, when virtual electronic ticket 350 is identified, the entry point terminal accesses the data base associated with the electronic ticket control system associated with public facility 100 and, if virtual electronic ticket 350 is properly authenticated, permits the customer to enter public facility 100. The entry point terminal may produce a visible or audible signal approving entry by the customer. Alternatively, if virtual electronic ticket 350 is not authenticated, the entry point terminal may generate an audible or visual alarm alerting a nearby gate attendant that the customer should not be admitted to public facility 100.

Fig. 4 illustrates electronic ticket control system 400 according to one embodiment of the present invention. Electronic ticket control system 400 comprises communication interface 405, processor 410, database (DB) 415, and memory 430.
Processor 410, database (DB) 415, and memory 430 are coupled to, and communicate via system bus 420. Communication interface 405 has an external network connection that interfaces with network bus 490. Communication interface 405 enables processor 410 to communicate with exemplary access points AP1-AP8 and exemplary entry point terminals EPT1-EPT4. Communication interface 405 also enables processor 410 to communicate with remote servers and other devices via the Internet.

Memory 430 stores site map file 432, communication application program 434, virtual ticket records 440, and active virtual ticket devices file 450. Virtual ticket records 440 contains a plurality of virtual ticket data records 441-443, which are arbitrarily labeled VT1 DATA, VT2 DATA and VT3 DATA, respectively. Virtual ticket records 440 comprises a master list of all virtual tickets that were sold to the particular event occurring at public facility 100. Each virtual ticket data record 441-443 contains the serial number or bar code of each virtual ticket, the section and seat number information associated with each virtual ticket, payment information (optionally), the privileges associated with each virtual ticket, and the like. The virtual tickets that are received from the virtual ticket devices are compared to the virtual ticket data in virtual ticket records 440 before admitting each customer to public facility 100.

Virtual ticket data records 441-443 may be downloaded via the Internet from a server associated with a ticketing agency that sells tickets to events held at public facility 100. Alternatively, electronic ticket control system 400 itself also may function as a server that potential customers may access over the Internet in order to buy virtual tickets. As each virtual ticket is sold to a potential customer, electronic ticket control system 400 creates and stores a corresponding virtual ticket data record 441 and transmits the electronic virtual ticket over the Internet to the customer.

Active virtual ticket devices file 450 contains virtual ticket device records 451-453 associated with virtual ticket devices that are in active communication with electronic ticket control system 400. After each received virtual ticket is received and authenticated, a virtual ticket device record for the corresponding virtual ticket device that has been admitted is created in active virtual ticket device file 450. Virtual ticket device records 451-453 are arbitrarily labeled VT DEVICE 1, VT DEVICE 2, and VT DEVICE 3, respectively.

Exemplary virtual ticket device record 451 comprises virtual ticket (VT) identification (ID) data field 461, privileges field 462, and location field 463. Database 415 normally holds the master copies of all of the information stored in memory 430. However, the information in database 415 is loaded into memory 430 for processing by processor 410.
Site map file 432 contains electronic map data that may be downloads to virtual ticket device 200 in order to display the location of the seat corresponding to a particular virtual ticket. The electronic map data also may illustrate the locations of the rest rooms, concession stands, vendor shops, ticket office 130, security office 140 and first aid station 150. Virtual ticket identification field 461 identifies the virtual ticket associated with virtual ticket device record 451. Privileges field 462 indicates the restricted areas in public facility 100 to which the virtual ticket gains admission. For example, privileges field 462 may indicate which restaurants and luxury boxes the user of a particular virtual ticket may enter. Finally, location field 463 indicates the current location of virtual ticket device 200.

Communication application program 434 comprises a communication protocol that may be transmitted to virtual ticket device 200 in order to permit virtual ticket device 200 to communicate with the access points and entry point terminals in public facility 100. According to one embodiment of the present invention, a user of virtual ticket device 200 may download communication application program 434 from electronic ticket control system 400 via the Internet before going to public facility 200. Alternatively, electronic ticket control system 400 may initially use a standard protocol to establish a simple connection with virtual ticket device 200 and then may download communication application 434 in order to establish a more advanced communication link.

For example, if EPT1 and virtual ticket device 200 are both Bluetooth-enabled systems, EPT1 may establish an initial Bluetooth connection with virtual ticket device 200 as the user of virtual ticket device 200 approaches EPT1. After the Bluetooth connection is established, EPT1 may download communication application program 434 to virtual ticket device 200. Thereafter, virtual ticket device 200 may use communication application program 434 to establish wireless LAN (e.g., IEEE 802.11) connections with one or more of EPT1-EPT4 and AP1-AP8 as the user of virtual ticket device 200 roams around public facility 100.

Fig. 5 depicts flow diagram 500, which illustrates the operation of electronic ticket control system 400 and portable virtual ticket device 200 according to one embodiment of the present invention. Initially, electronic ticket control system 400 receives a request for a virtual ticket from virtual ticket device 200. This request may be received via the Internet or via a telephone connection. In response, electronic ticket control system 400 transmits a virtual ticket to virtual ticket device 200. Alternatively, electronic ticket control system 400 may receive a virtual ticket data record for an already issued ticket from a remote ticket agency via the Internet (process step 505).
When the user finally arrives at public facility 100 to attend the event, virtual ticket device 200 transmits the virtual ticket stored in the virtual ticket device 200 to electronic ticket control system 400 via an entry point terminal. Electronic ticket control system 400 then compares the virtual ticket to the virtual ticket data records 440 stored in memory 430 or database 415 (process step 510). If the virtual ticket is authenticated, electronic ticket control system 400 transmits an authorization message to the entry point terminal and the user is admitted. Otherwise, the user is rejected (process step 515).

During the event, electronic ticket control system 400 may track the location of virtual ticket device 200 via the numerous access points and entry point terminals. If the user attempts to enter a restricted area, such as a private restaurant, a luxury box, or a premium seating area, the entry point terminal at the restricted area transmits the virtual ticket to electronic ticket control system 400. Electronic ticket control system 400 determines from the privileges data whether or not the user is permitted to enter the restricted area (process step 520).

As noted above, the facility operator may use the access points to transmit seating upgrade offers to the virtual ticket devices. These could be based on the designated seat location of the customer or the real time location of the customer. Electronic ticket control system 400 may transmit to virtual ticket device 200 the message: “Two seats are available in the section in front of you. Would you like to move there for an additional $10?”

Additionally, if virtual ticket device 200 has broadband capability and a high quality display, electronic ticket control system 400 also may transmit a video file (i.e., MPEG, AVI) or a picture file (i.e., JPEG, GIF, BMP) showing one or more views of public facility 100 from the upgraded seat.

Fig. 6 illustrates selected portions of electronic ticket control system 400 that offer seat/ticket upgrades to patrons of exemplary public facility 100 according to one embodiment of the present invention. In addition to the components illustrated and described above in FIGURE 4, electronic ticket control system 400 also comprises a plurality of application programs and data files stored in memory 430 that enable electronic ticket control system 400 to communicate with virtual ticket devices in order to transmit seat/ticket upgrade offers and to receive related responses. Memory 430 stores ticket upgrade control program 610, downloadable ticket upgrade graphical user interface (GUI) program 620, seating database (DB) 630, seat view files 640, and virtual ticket device locator program 650.

Processor 410 executes program instructions in ticket upgrade control program 610 to enable electronic ticket control system 400 to communicate with virtual
ticket devices in order to offer seat upgrades and to receive responses from the virtual ticket devices. It was noted in the above description of Fig. 2 that downloaded venue applications 214 in virtual ticket device 200 may include one or more applications executed by virtual ticket device 200 when the customer is at public facility 100. These applications may be downloaded before the customer arrives at public facility 100 (e.g., via the Internet) or may be downloaded at public facility 100 via entry point terminals EPT1-EPT4 or access points AP1-AP8. downloadable ticket upgrade GUI program 620 is one such downloadable program. ticket upgrade GUI program 620 provides a graphical user interface in virtual ticket device 200 that enables the user to interact with ticket upgrade control program 610. According to an exemplary embodiment of the present invention, the graphical user interface of ticket upgrade GUI program 620 may be similar to an e-mail application or to a two-way paging application. In an alternate embodiment of the present invention, the graphical user interface of ticket upgrade GUI program 620 may be similar to a browser application in that ticket/seat upgrade offers and photo views from the upgraded seats may be transmitted as HTML data and displayed in a web page format on virtual ticket device 200. ticket upgrade GUI program 620 displays one or more target upgrade seat selections to the user of virtual ticket device 200 and prompts the user to accept one of the upgrade seats or to refuse any upgrade offer. Optionally, ticket upgrade GUI program 620 may display one or more views of the playing area or stage from the upgrade seat(s). Seat view files 640 stores picture files (e.g., JPEG, BMP, GIF) associated with each seat in public facility 100. ticket upgrade control program 610 uses virtual ticket device locator program 650 to determine the location of virtual ticket device 200. Generally, the location of virtual ticket device 200 may be determined from the section and seat information associated with the virtual ticket of the user. However, assuming the user roams around, the location of virtual ticket device 200 may be determined by transmitting a message to virtual ticket device 200 prompting the user to enter his or her current location (i.e., nearby section and seat values). In still another embodiment of the present invention, virtual ticket device locator program 650 may determine the location of virtual ticket device 200 according to the location of the access point that is in communication with the virtual ticket device. In particular, in more advanced RF systems, virtual ticket device locator program 650 may use triangulation information captured by two or more access points to determine the location of virtual ticket device 200 without requiring any user input.

Seating database (DB) 630 is a master list of all seats in public facility 100. Processor 410, under control of ticket upgrade control program 610, determines from seating
database 630 which seats in public facility 100 have been sold and which seats are available (i.e., empty). Once the seat location of virtual ticket device 200 is determined, ticket upgrade control program 610 may compare the seat location information to the available seat information in seating database 630 to determine one or more seats that are superior to the seat associated with virtual ticket device 200. Superior seats are those available seats that are closer to the playing area or stage of public facility 100 or those that have a less obstructed view.

Ticket upgrade control program 610 may then generate and transmit to virtual ticket device 100 a seat (or ticket) upgrade offer message related to one or more of the identified superior (or upgrade) seats. Advantageously, the upgrade offer message may include at least one picture file showing views of the playing area or stage from the upgrade seat(s). The upgrade offer message also may include a upgrade premium price associated with each upgrade seat.

Since many patrons are part of a group, in an advantageous embodiment of the present invention, ticket upgrade control program 610 may offer a group of ticket upgrades to a group of related seats. For example, virtual ticket device 200 may contain a plurality of virtual electronic tickets 350 that are used by a family or a group of friends that are sitting together. Alternatively, each member of a family or a group of friends may use individual virtual ticket devices 200 that each contain a virtual electronic ticket 350. Ticket upgrade control program 610 may identify a group of related seats by identifying two or more virtual electronic tickets 350 that were paid for using the same credit card. Alternatively, when ticket upgrade control program 610 transmits a ticket (seat) upgrade offer message to virtual ticket device 200, ticket upgrade control program may also transmit a prompt message asking the user of virtual ticket derive 200 enter seat location information that identifies one or more other seats that should also be upgraded.

Fig. 7 depicts flow diagram 700, which illustrates a ticket upgrading operation performed by exemplary electronic ticket control system 400 and exemplary virtual ticket device 200 according to one embodiment of the present invention. Initially, electronic ticket control system 400 analyzes seating database 630 and identifies a list of empty seats that are available for upgrading other seats (process step 705). Electronic ticket control system 400 then compares a first seat location associated with first virtual ticket 350 with the identified list of available upgrade seats and determines which available seats are superior to the first seat location (process step 710). Next, electronic ticket control system 400 creates a seat
upgrade offer message related to one or more upgrade seats that are superior to the first seat location and transmits the seat upgrade offer message to virtual ticket device 200.

Optionally, electronic ticket control system 400 may transmit one or more seat view picture files and upgrade price information as part of the seat/ticket upgrade offer message (process step 715). Electronic ticket control system 400 also may transmit a prompt message asking the user of virtual ticket device 200 to identify other seats to be upgraded as well (process step 720). The user of virtual ticket device 200 uses the keypad of virtual ticket device 200 to accept (or refuse) the seat upgrade offer message and, optionally, to request other seat upgrades (process step 725). Virtual ticket device 200 then transmits a response message back to electronic ticket control system 400. Assuming the seat upgrade offer has been accepted, electronic ticket control system 400 transmits one or more upgraded virtual ticket(s) to virtual ticket device 200 (process step 730).
CLAIMS:

1. A method of doing business in a public facility comprising:
   determining the location of a first customer within the facility (100);
   transmitting to the first customer an image of a view from another location
   within the facility (100); and
   offering the customer an opportunity to move to the different location.

2. The method of claim 1, wherein the step of offering further includes offer the
   first customer a price which will be charged if the first customer chooses to move to the
   different location.

3. The method of claim 2 wherein the location of the customer is a first seat for
   which the customer has purchased admission at the facility (100) and the other location is a
   different seat within the facility (100).

4. The method of claim 3 wherein the offer is transmitted via a wireless
   communications system to a user device.

5. The method of claim 3 wherein the image and the offer are transmitted via a
   wireless communications system to a user device.

6. The method of claim 3 further comprising receiving a payment authorization
   message from the user device.

7. The methods of claims 3-6 wherein the user device is chosen from the group
   comprising telephones, personal data assistants, video game controllers, portable computers
   and their equivalents.

8. The method of claim 3 further comprising:
   determining the seat location of a second customer within the facility (100);
transmitting to the second customer an image of a view from the first seat; and
offering the second customer an opportunity to move from his seat location to
the first seat.

9. The method of claim 8 wherein the another location is the seat location of the
second customer.

10. A virtual ticket control system for upgrading tickets of customers to a public
facility (100) comprising:

   a plurality of access points (AP1-AP8) capable of being disposed throughout
   said public facility (100), each of said access points capable of establishing a communication
   link to at least one of a plurality of virtual ticket devices (200) used by customers and
   receiving at least one virtual ticket transmitted by said at least one virtual ticket (350) device
   (200);

   a memory (430) capable of storing a seating database identifying empty seats
   in said public facility (100) and occupied seats in said public facility (100); and
   a ticket upgrade controller (410,610) coupled to said plurality of access points
   (AP1-AP8) and said memory (430) and capable of receiving a first virtual ticket (350) from a
   first one of said plurality of virtual ticket devices (200), wherein said ticket upgrade

controller (410,610) compares a location of a first seat associated with said first virtual ticket
(350) with said seating database and identifies a first empty seat having a more desirable
location than said first seat location and wherein said ticket upgrade controller (410,610)
generates a ticket upgrade offer message associated with said first empty seat and transmits
said ticket upgrade offer message to said first virtual ticket device (200).

11. The virtual ticket control system as set forth in Claim 10 wherein said ticket
upgrade offer message comprises an image data file showing a view from said first empty
seat.

12. The virtual ticket control system as set forth in Claim 10 wherein said ticket
upgrade offer message comprises a premium price associated with said first empty seat.

13. The virtual ticket control system as set forth in Claim 10 further comprising a
location determination apparatus (410,650) capable of determining said first seat location.
14. The virtual ticket control system as set forth in Claim 13 wherein said location determination apparatus (410,650) determines said first seat location from seat data information associated with said first virtual ticket (350).

15. The virtual ticket control system as set forth in Claim 13 wherein at least one of said plurality of access points (AP1-AP8) comprises a radio frequency (RF) transceiver capable of receiving said first virtual ticket (350) from said first virtual ticket device (200) and said location determination apparatus determines said first seat location based on a location of said at least one access point (AP1-AP8).

16. The virtual ticket control system as set forth in Claim 13 wherein at least one of said plurality of access points (AP1-AP8) comprises an infrared (IR) transceiver capable of receiving said first virtual ticket (350) from said first virtual ticket device (200) and said location determination apparatus determines said first seat location based on a location of said at least one access point (AP1-AP8).

17. The virtual ticket control system as set forth in Claim 13 wherein at least one of said plurality of access points (AP1-AP8) comprises a wireline interface adapted to engage a corresponding wireline interface associated with said first virtual ticket device (200) and capable of receiving said first virtual ticket (350) from said first virtual ticket device (200) and wherein said location determination apparatus determines said first seat location based on a location of said at least one access point.

18. The virtual ticket control system as set forth in Claim 10 wherein said ticket upgrade controller (410,650) determines at least a second seat location associated with said first virtual ticket (350) and identifies at least a second empty seat associated with said first empty seat.

19. The virtual ticket control system as set forth in Claim 18 wherein said ticket upgrade offer message comprises upgrade information related to said second empty seat.

20. A method of upgrading tickets of customers to a public facility (100) comprising:
establishing a communication link between at least one of a plurality of virtual ticket devices (200) used by customers and a first one of a plurality of access points (AP1-AP8) capable of being disposed throughout the public facility (100);

receiving a first virtual ticket (350) transmitted by a first one of the plurality of virtual ticket devices (200);

accessing in a memory (430) a seating database identifying empty seats in the public facility (100) and occupied seats in the public facility (100); and

comparing a location of a first seat associated with the first virtual ticket (350) with the seating database;

identifying a first empty seat having a more desirable location than the first seat location;

generating a ticket upgrade offer message associated with the first empty seat;

and

transmitting the ticket upgrade offer message to the first virtual ticket device (200).

The method as set forth in Claim 20 wherein the ticket upgrade offer message comprises an image data file showing a view from the first empty seat.

The method as set forth in Claim 20 wherein the ticket upgrade offer message comprises a premium price associated with the first empty seat.

The method as set forth in Claim 20 further comprising the step of determining the first seat location.

The method as set forth in Claim 23 wherein the step of determining the first seat location comprises the step of determining the first seat location from seat data information associated with the first virtual ticket (350).

The method as set forth in Claim 23 wherein the first access point comprises a radio frequency (RF) transceiver capable of receiving the first virtual ticket (350) from the first virtual ticket device (200) and the step of determining the first seat location comprises the step of determining the first seat location based on a location of the first access point.
26. The method as set forth in Claim 23 wherein the first access point comprises an infrared (IR) transceiver capable of receiving the first virtual ticket (350) from the first virtual ticket device (200) and the step of determining the first seat location comprises the step of determining the first seat location based on a location of the first access point.

27. The method as set forth in Claim 23 wherein the first access point comprises a wireline interface adapted to engage a corresponding wireline interface associated with the first virtual ticket (200) device and capable of receiving the first virtual ticket (350) from the first virtual ticket device (200) and the step of determining the first seat location comprises the step of determining the first seat location based on a location of the first access point.

28. The method as set forth in Claim 20 further comprising the steps of determining at least a second seat location associated with the first virtual ticket (350) and identifying at least a second empty seat associated with the first empty seat.

29. The method as set forth in Claim 28 wherein the ticket upgrade offer message comprises upgrade information related to the second empty seat.
FIG. 2
ETCS 400 receives a request for a virtual ticket from VTD 200 and transmits a VT to VTD 200; or ETCS 400 receives a VT data record from a remote ticket agency via internet.

VTD 200 transmits virtual ticket to ETCS 400 via EPT and ETCS 400 compares virtual ticket to VT data records.

If virtual ticket is authenticated, ETCS 400 transmits authorization message to EPT and user is admitted; otherwise user is rejected.

ETCS 400 tracks location of VTD via access points and entry point terminals. If user enters restricted area, EPT transmits virtual ticket to ETCS 400. ETCS 400 determines from privileges data if user is permitted to enter restricted area.

Continue.

FIG. 5
ETCS 400 analyzes seating DB 630 and identifies a list of empty seats available for upgrading

ETCS 400 compares a first seat location of first virtual ticket 350 with the identified list of available seats and determines which available seats are superior to the first seat location

ETCS 400 creates seat upgrade offer message related to the one or more superior seats and transmits seat upgrade offer message to VTD 200. Optionally, ETCS 400 transmits one or more seat views and upgrade price information as part of seat upgrade offer message

Optionally, ETCS 400 transmits prompt message asking user of VTD 200 to identify other seats to be upgraded as well

User of VTD 200 accepts/refuses seat upgrade offer message and, optionally, requests other seat upgrades

ETCS 400 transmits upgraded virtual ticket(s) to VTD 200

FIG. 7
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G06F17/60

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G06F G07F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
WPI Data, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<td>X</td>
<td>WO 01 71669 A (GLOBAL ETICKET EXCHANGE LTD ;NESTOR TOD A (US); PATRICK ROBERT (US) 27 September 2001 (2001-09-27) page 6, line 10 -page 36, line 16</td>
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□ Further documents are listed in the continuation of box C.  ❌ Patent family members are listed in annex.

* Special categories of cited documents:
  *A* document defining the general state of the art which is not considered to be of particular relevance
  *E* earlier document but published on or after the international filing date
  *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
  *O* document relating to an oral disclosure, use, exhibition or other means
  *P* document published prior to the international filing date but later than the priority date claimed

*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

*Y* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

*W* document member of the same patent family

Date of the actual completion of the international search
14 January 2003

Date of mailing of the international search report
12/02/2003

Name and mailing address of the ISA
European Patent Office, P.B. 5818 Patentlaan 2 NL–2280 HV Rijswijk, tel. (+31-70) 540-2040, Tx. 51 851 epo nl, fax: (+31-70) 340-2016

Authorized officer
Beatty, J

Form PCT/ISA/210 (second sheet) (July 1992)
INTERNATIONAL SEARCH REPORT

Box I  Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
   because they relate to subject matter not required to be searched by this Authority, namely:

2. ☑ Claims Nos.: 1-9
   because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
   see FURTHER INFORMATION sheet PCT/ISA/210

3. ☐ Claims Nos.:
   because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II  Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest
☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.
Continuation of Box I.2

Claims Nos.: 1-9

The claims 1-9 relate to subject-matter for which no search is required according to Rule 39 PCT. Given that the claims are formulated in terms of such subject matter or merely specify commonplace features relating to its technological implementation, the search examiner could not establish any technical problem which might potentially have required an inventive step to overcome. Hence it was not possible to carry out a meaningful search into the state of the art (Art. 17(2)(a)(i) and (ii) PCT; see PCT International Search Guidelines, Chapter VIII, items 1 to 3).

The applicant’s attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.
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