AIRCRAFT IN-FLIGHT CABIN MANAGEMENT APPARATUS

Technical Field

This invention relates to apparatus for use in an aircraft transportation management system.

Background Art

Today's aircraft in flight ply the increasingly crowded airways with many aircraft pressed into service around the clock and throughout increasingly larger global regions.

Gone are the days, by-in-large, when single aircraft having global range capabilities will be dedicated to a single repetitive air routing with the same group of cabin attendants in rotating service for the same air routing. Small feeder airlines may be so characterized, but not the larger carriers which frequently include air routes which are international in nature.

It is believed that the public is unaware that many of the flight crews and specifically cabin attendants arrive at work on any given day without a clear indication of where the aircraft they are to perform their services on is going. Because of the randomness of the destinations, i.e., national, international, etc., and the exact nature of the aircraft, i.e., wide body, narrow body, etc., the flight crew and attendants must carry with them all flight information parameters essential to the safe, efficient movement of the aircraft and the maintenance of appropriate passenger services. All information necessary for the crew or attendants is either carried aboard personally, is stored on the aircraft or is delivered to the aircraft's cabin moments before flight time. Catering services that provide food and the delivery of alcoholic beverages must all be inventoried before the flight commences and then accounted for at the flight's destination.

The insistance by the public that departures be on time frequently will find the aircraft airbourne without a manifest listing the passengers and their seat assignments. Although not critical to servicing the passengers, the specific identity of the passengers by name and seat assignment would greatly enhance the passenger perceived attention they are receiving.

The public is also unaware that in respect of beverage service, there is little to prevent cabin attendants from bringing aboard their privately purchased liquor in miniature portions and selling their private supply before the airlines liquor is dispensed. The losses to the airlines in this area alone is thought to be substantial. Headset sales and duty free sales are similiarly recognized as potential airline loss areas in

so far as there is cabin attendant wrongful conduct.

International flights and flights connecting with international flights are causing increasing numbers of passengers to tender foreign currency in exchange for services on board the aircraft with an exchange rate dilemma for the flight attendants. Devaluations of currencies, as well as the strengthening of other currencies in what is frequently a spontaneous manner from day to day have resulted in large losses for the airlines, for there is no present way in which the flight attendants can be kept abreast of these changes.

The airlines assult on the problem outlined above have been massive. Those parties at the airline headquarters are quick to spot changes in such matters as currencies, flight schedules, and to provide supplemental information change sheets for each attendant to allow the attendant to update their global information materials. Because the airline has no way of knowing exactly which air routes and aircraft type the attendants will be involved with, the attendants receive prior to flight, over a period of time, volumes of new materials to be substituted for old material in need of change and update.

It is not surprising that the airlines suspect that attendants pressed for time selectively update their global information materials to include only that information they think they will need. When and if this occurs, an attendant may well find themselves traveling to an air route destination without the most current information concerning the air route.

To date, there is no simple solution for the problems outlined hereinbefore. The invention to be described hereinafter provides a stunningly simple and

novel manner of handily putting to rest virtually all concerns the airlines have had in the area of aircraft transportation, and cabin management outlined hereinbefore.

The invention provides apparatus for the in-flight management of aircraft occupant needs, comprising:

an aircraft-carried computer comprising a microprocessor in association with a memory, a video terminal, a printer and a data input device that includes a keyboard; and

an aircraft-carried radio receiver coupled to the microprocessor for updating the memory in response to received radio signals, independently of the data input device.

Advantageously the microprocessor is organized to handle at any time only a restricted amount of data from the memory, the restriction being user-definable by input signals from the data input device to identify any pair of departure and destination airports. The keyboard may thus be used to command departure/destination paired location information to be selected from global information in the memory for display at the video

terminal which may have a cathode ray tube (CRT) or flat screen display. Alternatively or additionally the same selected information may be delivered in a hard copy print-out.

The apparatus of the invention efficiently interfaces required aircraft cabin management functions with ground management functions via the radio receiver which is preferably a transceiver providing an air-ground, ground-air digital communications link. Using that link, the memory may be modified from a remote point on the ground, either directly or via a satellite. Furthermore information can be transmitted from the aircraft to a ground station or headquarters concerning a wide range of aircraft cabin activities such as, but not limited to, discrepancy reports, crew block time, cabin maintenance items, passenger comments, in-flight survey information, statistical information regarding catering inventories for specific departure/destination flight segments, connecting passenger information, liquor sales, headset sales and duty free sales.

The memory preferably contains global flight segment data representing information pertinent to each flight segment which the aircraft is likely

to fly. For example, the global flight segment data may include departure and arrival identifiers for such flight segment stored in the memory. The memory preferably comprises a general database file having a plurality of flight segment records wherein each of the flight segment records includes at least a portion of the global flight segment data for a particular flight segment. Besides departure and arrival airport identifiers, the flight segment records may include the flight number and optionally passenger service information, meal service data and departure and arrival times for each flight segment. The flight segment records are preferably stored in addressable locations in the database file, and the addressing means preferably includes combining means for combining the departure and arrival identifiers for a desired flight segment record to create a combined expression and means for converting the combined expression into the address of the addressable location in which the desired flight segment record is located.

DRAWINGS

Figure 1 is a geographic representation of a global region of the planet earth, where the invention finds utility,

Figure 2 is a three-dimensional illustration depicting a portion of the earth and a schematic representation of the various components involved in carrying out the invention,

Figure 3 is a block diagram of a preferred embodiment of the invention,

Figure 4 is a three-dimensional illustration of the apparatus embodying the invention as the apparatus would typically appear on board an aircraft,

Figure 5 is a diagrammatic representation of the cabin management data base structure in the aircraft on board memory;

Figure 6 is a diagrammatic representation of the structure of the general data base file that is a part of the cabin management data base structure of Figure 5 in the aircraft on board memory;

Figure 7 is a diagrammatic representation of the structure of the movie file that is a part of the cabin management data base of Figure 5 in the aircraft on board memory;

Figure 8 is a diagrammatic representation of the structure of the amenities file that is a part of the cabin management data base of Figure 5 in the aircraft on board memory;

Figure 9 is a diagrammatic representation of the structure of the foreign language file that is a part of the cabin management data base of Figure 5 in the aircraft on board memory;

Figure 10 is a diagrammatic representation of the structure of the general message file that is a part of the cabin management data base of Figure 5 in the aircraft on board memory;

Figure 11 is a diagrammatic representation of the structure of the special message file that is a part of the cabin management data base of Figure 5 in the aircraft on board memory;

Figure 12 is a diagrammatic representation of the structure of the destination message file that is a part of the cabin management data base of Figure 5 in the aircraft on board memory;

Figure 13 is a diagrammatic representation of the structure of the currency file that is a part of the cabin management data base of Figure 5 in the aircraft on board memory;

Figure 14 is a diagrammatic representation of the structure of the inflight sales file that is a part of the cabin management data base of Figure 5 in the aircraft on board memory;

Figure 15 is a diagrammatic representation of the structure of the discrepancy file that is a part of the cabin management data base of Figure 5 in the aircraft on board memory;

Figures 16A, 16B and 16C are diagrammatic representations of the structure of the file history data base that is a part of the cabin management data base of Figure 5 in the aircraft on board memory;

Figure 17 is a block diagram of the cabin management system control structure;

Figure 18 is a block diagram of the GMT time logic and header display logic;

Figure 19 is an illustration of header display;

Figure 20 is an illustration of a preflight briefing display; and

Figure 21 is a partially cut away illustration of an on board terminal for use with the cabin management system.

Best Mode for Carrying Out the Invention

Reference is now made to Figure 1 which is intended to represent a global region 11 of the planet earth wherein the system embodying the invention finds utility. In order to explain the theory of the inventive

principal, resort to what is commonly known in Boolean Algebra as a "Venn Diagram" will be called upon. A study of Figure 1 will reveal the outlines of such a diagram. It should be understood that the use of the Venn Diagram approach is intended only to facilitate the magnitude of the problem solved by the invention to be described more fully hereinafter, and is not intended to yield a mathamatical equation that in any way will be employed to limit the invention.

A circle 12 is shown covering most of the global region 11. The circle 12 is intended to represent all global information concerning parameters essential to the safe, efficient movement of aircraft, and all information concerning maintenance of aircraft occupant services within the global region encompassed by the global information circle 12. The phrase, aircraft occupant is intended to include passengers as well as an airline flight crew.

For purposes of explanation only, there are shown four descrete geographic ground locations, which are, reading from left to right LAX (Los Angeles); JFK (John F. Kennedy, New York); CCS (Caracas, Venezuela) and LHR (London Heathrow Airport). It is significant to note at this time that every airport in the world, by convention, is given a three (3) letter "City/Airport Code". Each of the airports noted above have respectively associated therewith a circle, namely, LAX has circle 13, JFK has circle 14, CCS has circle 16 and LHR has circle 17. Each of the circles 13, 14, 16 and 17 is intended to represent all global information concerning essential parameters germane to the city/airport depicted at the center of each of the circles 13, 14, 16 and 17.

Three aircraft 18, 19 and 21, as well as a

satellite 22, and a ground station 23 are shown schematically in Figure 1. Aircraft 18 is intended to represent an aircraft departing from LAX (Los Angeles) with a destination of JFK (New York, New York). Aircraft 19 has a departure/destination route which can be characterized as JFK/CCS, and aircraft 21 has a departure/destination air route which is characterized as LHR/JFK.

The flight crew in the case of aircraft 18 headed from LAX to JFK has specific need for only that information contained within the shaded intersection 24 which represents only that information from all the global information that is essential with respect to aircraft 18 flying between Los Angeles (LAX) and New York (JFK). Accordingly, the flight segment, Los Angeles to New York and the information in the intersect pursuant to the invention will be characterized as LAXJFK, a new term, which is a paired departure/destination expression.

In a similar manner, it will be appreciated that the shaded intersection 26 of information circles 14, 16 represents only that information from all the global information that is essential with respect to aircraft 19 flying between New York (JFK) and Caracas, Venezuela (CCS). The flight segment just described produces the following new expression: JFKCCS.

Finally, it should be apparent that shaded intersection 27 of information circles 14 and 17 represents only that information from all the global information that is essential with respect to aircraft 21 flying between London's Heathrow Airport (LHR) and New York's (JFK). The new expression for this flight segment will be LHRJFK.

From the foregoing it can be seen that when aircraft are moving throughout a global region 11 between discretely identifiable global locations, i.e., LAX, JFK, CCS and LHR, each air route between cities can be characterized as departure/destination pair locations. The details of the apparatus employed to carry out the invention which makes use of "departure/destination" paired locations will now follow. The cooperative function of the satellite 22 and the ground station 23 will be covered hereinafter when the total system operation of the invention is discussed.

It will be recalled that every flight crew which includes the cabin attendants is required to have access to all global information represented by the global information circle 12. With this in hand, reference is now made to Figure 2 which is a three-dimensional illustration depicting a portion of the earth and a schematic representation of the various components involved in carrying out the invention.

Figure 2 is intended to represent all facets of an aircraft management system which could include, (1) an aircraft such as plane 18 having aircraft management system hardware 31 on board, (2) a ground station 23 with a transceiver not shown connected by telephone lines 32 to a headquarters facility 33, and (3) a communications satellite 22 coupled respectively to the ground station 23 and the plane 18 by digital communication links. The plane 18 has a digital communication link 35 shown between the plane 18 and the ground station 23.

Reference is now made to Figure 3 which is a block diagram of the aircraft carried hardware 31 of Figure 2. There is shown in dotted outline the cabin 40 of the aircraft 18, as well as an avionics rack 41.

Within the aircraft and associated with the avionics rack 41 is a high frequency transceiver 42 which functions as an information handling means. The invention also contemplates the use of a very high frequency (VHF) transceiver. The transceiver 42 is capable of communications with the ground station 23 or a satellite 22 (Figure 2) and employs a digital signal which operates at a standard rate of 2400 bits/second. Typically, a message to or from the transceiver 42 has a length of less than half a second.

The high frequency transceiver 42 is coupled as is schematically shown by a line 43 to a high frequency buffered modem 44 which in turn is coupled through central processing unit (CPU) 46 via connection 45 to a memory unit 49 via connections 47, 48. The CPU 46 is a microprocessor of conventional design. In practice all global information including the essential parameters are delivered to and through the CPU 46 to the memory unit 49 while the aircraft is on the ground. It is most significant to note however that the memory unit and the information therein may be modified from the ground via the digital data communication link 35. Alternatively, the memory unit 49 and its stored information may be modified from a satellite 22 via a communication link 36 (Figure 2) on command from a ground station 23, which in turn has received an information change message over telephone lines 32 from an airline headquarters facility. Typically, the remote stations such as station 23 are located at the airports which are descretely identifiable by the three letter city/airport code aforementioned. In Figure 2, the remote station 23 has been arbitrarily chosen to be Chicago's O'Hare field which has the three letter code ORD.

The memory unit 49 is operatively coupled to and through the microprocessor which constitutes the CPU 46 via connectons 47, 48, and by connections 51, 52 to a keyboard 53 which controls via connection 54 a cathode ray tube (CRT) 55 (Figure 4) at video terminal 56. A hard copy printer 58 is coupled via connection 57 to the microprocessor of the CPU 46 to thereby afford users of the system either a video visual message or a hard copy print-out.

Typically, aircraft that have video entertainment systems for the passengers include a number of remote viewing screens. One such screen 60 is shown coupled via connection 59 to the CPU 46 to be controlled from the keyboard 53 when information that would be helpful to the passengers, such as connecting flights, is needed just prior to the scheduled destination.

A magnetic card reader 62 is coupled via connection 61 to the CPU 46 and provides a means of security such that only those flight attendants that are authorized can gain access to the cabin management system.

A mark sense card reader 64 is coupled via connection 63 to the CPU 46 and provides a ready means for a quick input of data or commands to the system.

In the avionics rack 41 there is also shown an automatic communications addressing and reporting system management unit 70, the details of which do not form a part of the present invention. The management unit 70 which is mutually coupled respectively via connections 68, 69 to CPU 46 and buffered modem 44 interfaces with the pilot as well as the communications link in a manner not shown.

In operation, the keyboard 53 is operative to command departure/destination paired information from the global information stored in the memory unit 49. This departure/destination paired information may be displayed alternatively or simultaneously by way of CRT 55 of video terminal 56 and/or a hard copy print-out 80 (Figure 4) from printer 58. In addition, as noted earlier, the information may also be commanded for viewing by the passengers via the video entertainment system 60.

Reference is now made to Figure 4 which illustrates in three-dimensional form the actual system, as it now exists, for use in commercial aircraft. The reference numerals employed in Figure 4 correspond to the reference numerals heretofore used in respect of the block diagram description of Figure 3.

From the foregoing it should be apparent that a program scheme has been developed utilizing the world wide three letter airport and/or city codes to access global information. The departure and arrival city codes are combined to form a new expression. This combined new expression is then used to access the specific information unique to a particular flight segment. The technique of utilizing departure/destination paired locations in the form of a new expression combines known information in an unusual manner to solve the problem of displaying flight segment information for use by the cabin attendants.

As was noted earlier, the system inherently has designed therein a security function, such that when the cabin management system has initial power applied to it, there is displayed on the CRT 55 a request for the user to insert an "identity" card in the magnetic card reader 62. This reader is of the type that reads a magnetically

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coded stripe on a "credit card" type of card. By this means the user may specify personnel who are authorized to access the cabin management system and prevent operation by passengers or other unauthorized personnel.

In order for the user to obtain the pre-flight briefing, an authorized user must input via the keyboard the departure and destination stations. The CRT 55 then displays these stations, Greenwich UK Mean Time (GMT), local time at departure and arrival stations and other information relevant to that flight such as specifics of the services offered on that flight.

As was noted earlier, a constant problem for the airline has centered on maintaining an accurate record of catering supplies boarded on each flight. This is an inventory and financial record-keeping function which is made more efficient by the invention of this specification. The video terminal 56, and specifically the image on the CRT 55 requests user to input the number of meals boarded by class, headsets, liquor supply, duty free objects all of which data must be inventoried when the items are boarded. Input of this information can be made via a mark sense card reader 64 or the keyboard 55. The design of the system is such that the information concerning inventory may be communicated in a down-link fashion via the high frequency transceiver 42 to a ground station 23 such as depicted in Figure 2. The ground station has a transceiver and an associated CPU, memory, etc., not shown.

Passenger load information may be entered manually at the keyboard 53 for storage in the memory 46. Should the information that appears on a manifest delivered to the cabin crew just prior to flight appear to be incomplete, a remote ground station at the point of

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departure may transmit the complete manifest shortly after the aircraft is airborne.

In the matter of in-flight announcements that are desired to be delivered to the passengers, it will be appreciated that stored within the memory 46 are desired announcements in whatever languages the flight segment typically requires. It should also be noted that legally approved announcements may also be delivered via the printer hard copy 80 for the cabin attendants to use directly as they make the necessary announcements through the aircraft's intercom system to the passengers.

In the matter of currency conversions, the cabin management system may function automatically, at user request, to make available via the printer 58 or video terminal 56 those currency conversions which are most relevant to the flight segment in progress or any other currency conversions required by the air crew.

In such matters as customs and document control, the cabin management system can present specific textual information relavent to customs regulations or other documentation that is customarily required for this unique departure/destination flight segment. If the user of a system embodying the invention so desires, the memory unit 46 may be polled via the keyboard 53 to provide an efficient access to "handbook" type documentation stored in the cabin.

In the matter of connecting flight information, this function is currently provided, by many users, by means of voice channel communications. This function can be significantly enhanced by the invention hereinbefore described. The cabin management system via its printer 58 or its video terminal 56 may provide automatically at

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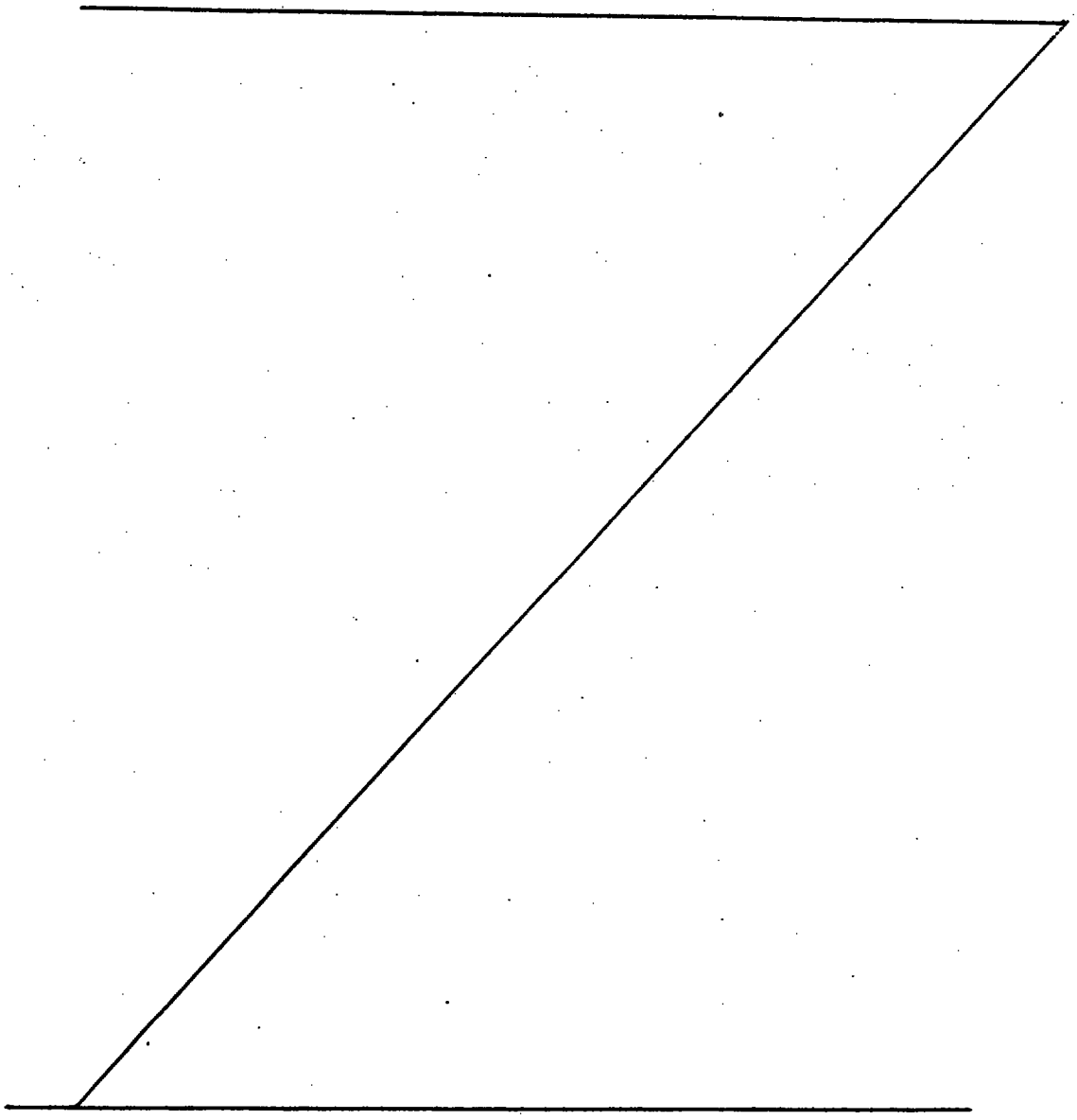
the printer and the video terminal, as well as through the entertainment system 60 connecting flight information. This feature is especially convenient in those cases of late arrival or arrival at an alternate destination. The cabin management system contemplates that unusual passenger or crew connection problems might be down-linked via the high frequency transceiver 42 and the digital communication link 35 for study by headquarters personnel who are skilled in unscrambling this type of problem.

Another aspect of the system allows for a record to be maintained of cabin maintenance items, such as defective seats, lights or other systems which could be logged into the memory and then down-linked as described earlier for maintenance action upon arrival at the destination. At the end of each flight segment there is what is termed a debriefing and flight report which requires the cabin crews input. Here again, via the keyboard 53 or mark sense card reader 64 a summary of the flight segments various transactions may be entered and then the user may call from the memory 46 a printed hard copy 80 of a summary report from the printer 58. Statistical review of flight segment sales of liquor, headsets, and duty free items will allow airline management to home in for flight crews that appear to have statistically significant lower sales than are normally experienced for a given departure/destination, flight segment. The ability of headquarters personnel to detect such apparent low sales and the flight crew involved will allow the airlines to quickly determine from ground based mass memory whether the low sales and flight crew have some correlation in respect of other flight segments. This type of investigative study or at least the awareness of such a capability is expected to reduce the losses now believed to occur.

At the end of each flight, as would be expected, there is a sign-off function which serves to complete the accountability of the cabin crew for the flight completed. This sign-off function will cause selected information generated during the flight segment to be made permanent in the memory 46, and will allow the cabin management system to be initialized for the next flight.

In order to provide management information relating to the various operations in the passenger cabin to the flight crew and airline management as summarized above in the most efficient and expeditious manner, it has been determined that the most important data should be stored in the on-board memory 49. Furthermore this data should be organized in such a manner as to provide for efficient storage and retrieval. In Figure 5 is illustrated the preferred embodiment of the data organization in the on board memory 49. The cabin management data base is composed of a number of data and program elements. For example, the memory unit 49 which in the preferred embodiment of the invention is a winchester type fixed disk, contains a disk directory 100 that provides the CPU 46 with the physical locations of the various

data files and programs on the disk 49. In addition, the cabin management data base on disk 49 would include a storage area 102 for an operating system such as iRMX-86 for the CPU 46 as well as a storage area 104 for the computer programs for implementing the cabin management functions.



The data structure on the disk memory 49 also includes various files for storing cabin management data. Included is a general data base 106 which has a data record for each flight segment and is illustrated in detail in Fig. 6. Also, included in the cabin management data base 49 are a series of auxiliary data base files including: a movie file 108, an amenities file 110, a language file 112, a general message file 114, a special message file 116, a destination message file 118, a currency file 120, an inflight sales file, a discrepancies file 124 and an invalid employee number file 126. The structures of these files are illustrated in Figs. 7-15.

The general data base or flight segment file 106 is organized into a series of records as indicated by reference numerals 107A-107D. At a minimum, there should be one record for each flight segment over which the aircraft is likely to operate. It may well be appreciated that there can be a large number of records 107A-107D, especially for the larger airlines due to their extensive route structures. The headings for the various fields in the records 107A-107D provide a brief description of the contents of each field of the records. For example, the first field 106A in each record 107A-107D is a three character alpha field containing the identifier of the departure airport for a particular flight segment and the second field 106B is a three character alpha field that contains the identifier for the arrival airport for the flight segment. As a result, each one of the records 107A-107D in the general data base file 106 contains information relating to a particular flight segment as identified by the combination of the departure airport 106A and the arrival airport 106B.

In the preferred embodiment of the invention, the general data base file 106 is stored in a random access memory 49 which may preferrably be embodied in a rotating disk memory such as a winchester type disk. Individual records such as 107A representing flight segments can be accessed from the general data base file 106 by combining the departure station code such as LAX for Los Angeles International Airport with the arrival station code such as ORD for Chicago O'Hare International Airport to generate a combined expression LAXORD. This combined expression or string can then be used as a disk file address or key in order to directly access the general data base file record 107A-107D that contains the information for the desired flight segment as defined by the combined departure and arrival identifiers. The file structure as illustrated in Fig. 6 combined with the above described method of access provides an unusually efficient means of organizing cabin management data as well as providing an expeditious means for accessing that data which can be of particular use to the flight crew and airline management.

Along with the fields 106A and 106B containing the departure and arrival station codes or identifiers, the flight segment file records 107A-107D include a field 106C that stores a flight number for a particular flight segment. The flight number segment 106C is a four character ASCII number field that identifies the official airline flight number. Normally flight numbers are specified by a three digit number 1-999. But special flights for some airlines are often specified by the flight numbers 1000-1999. This particular field 106C may also be combined with the departure and arrival

identifiers 106A and 106B to provide a data base key for accessing a record 107A-107D representing a flight segment for a particular flight number. Separate flight segment or general data base records 107A-107D may be necessary for different flight numbers where the information contained in the general data base file 106 would vary over the same flight segment for different flights. For example, on a morning flight over a particular segment such as from Los Angeles to Chicago breakfast may be served whereas on a later flight dinner would be served thereby requiring two separate records even though the flight segment is the same.

In a similar manner, the type of aircraft to be flown on a particular flight segment is provided in a field 106D. The aircraft type field 106D can consist of a three character alpha numeric field used to signify the aircraft type specified in the particular flight segment record 107A-107D. One purpose of this field is to provide individual records containing the actual service and data for a particular flight segment when more than one aircraft type is used on that flight segment. This field may also be used for database key access in the manner described above. An example of three character codes that can be used in field 106D is illustrated in Table I below.

TABLE I

721 - Boeing 727-35
722 - Boeing 727-235
727 - Boeing 727-21
72A - Boeing Stretch 727-221
72S - Boeing 727-2D4
732 - Boeing 737-200
747 - Boeing Widebody 747-100
74L - Boeing Widebody 747-SP

D11 - Douglas DC10-10
D1C - Douglas DC10-30
L15 - Lockheed L-1011-500

Also included in the general data base records 107A-107D are two fields 106E and 106F that contain the departure time and arrival time respectively for that particular flight segment. The departure time 106E and arrival time 106F are represented in fields 106E and 106F as four character numeric fields that contain the local departure and arrival times from the specified departure and arrival airport gates. The times are stored in 24 hour military time format.

In addition to the arrival time and departure time, each flight segment record 107A-107D includes a field 106G that contains the scheduled flight time for that flight segment. Field 106G is a four character numeric field that contains the estimated elapsed time from the departure station gate to the arrival station gate. This time is stored in the 24 hour military time format.

An eighth field 106H is a three character alpha field that is used to store the official airport designator for an airline designated service base. This field 106H can be used to identify the base station for a specified aircraft.

In the event that the arrival time in 106B and the departure time in 106E are stored in GMT time, a field indicated at 106I can be provided to store the delta quantities that represent the difference between GMT and local time for either or both the departure time 106E and arrival time 106F.

The mileage between the departure station and the arrival airport is stored in a field 106J.

It is the practice among some airlines to have multiple flight numbers for the same flight. For example, in an aircraft that is making an around the world flight, a basic flight number such as 001 may be issued to indicate the around the world itinerary while individual flight numbers may be issued for intermediate segments of the flight such as 427 for a Los Angeles to New York segment and 319 for a London to Rome segment. These alternative flight numbers can be stored in an aka field indicated at 106K of the general data base file 106.

For aircraft or flight segments that extend over substantial bodies of water, it is often necessary or a matter of law that life vests be carried on the aircraft. In a field 106L of the general data base file 106 a flag is provided that indicates whether or not a life vest is required on that flight segment.

For longer flights, the airlines frequently provide movies for passenger entertainment. Information with respect to the movies to be shown on a particular flight segment is provided in a field 106M of the general data base. Stored in this field are the numbers of the individual records in the movie file 108 that contain the information with respect to the movie that is to be shown on that flight segment. In the preferred embodiment of the invention, the field 106M of, for example data record 107A, would contain a first number (NO OF RECS) indicating the number of movie records to be accessed for that flight and in this illustration three numbers (REC #) that represent the record numbers in the movie file 108 that contain the information with respect to the movies shown or to be shown on that flight segment. The record numbers (REC #) can

then be used as disk file addresses to directly access the record from the movie file 108. In the example shown in Fig. 6, the first number in record 107A indicates that there are two records in the movie file 108 of Fig. 7 that contain information with respect to the movies to be shown on that flight segment and the second numbers 6 and 10 are the record numbers of the records containing that information and these numbers can be used as keys to directly access those records from the movie file 108. In the preferred embodiment of the movie file 108 shown in Fig. 7, the information stored in the records as indicated by 108A, 108B and 108C are stored in a form or format that may be displayed directly on the display screen 55 of the terminal shown in Fig. 4 without additional processing.

Another category of information stored in the records of the general data base 106 are the meals to be served during the flight. This information is stored in a field 106N in the general data base file 106 in the form of a code such as B for breakfast, L for lunch or D for dinner.

A further important category of information that should be made available to the flight crew is the types of amenities that are to be provided to the passengers during that particular flight segment. Since on some long international flights, the list of amenities provided to the first class, business class and coach class passengers can be quite extensive, each record in the general data base file 106 is provided with a field 106O which contains the key identifying a record number in the amenities file 110 as shown in Fig. 8. As shown in Fig. 8, the amenities are stored in the amenities file 110 in such a manner that the information in each record is ready for immediate

display without further data manipulation. The structure of the amenities field 106O is the same as the structure of the movie field 106M in that the number of records is stored along with their addresses.

Also, in international flights, it is desirable to have crew members with the ability to speak various foreign languages. The foreign languages required for any flight segment are indicated by a field 106P in the general data base 106 which contains a key that identifies a particular record in the foreign language file 112 as shown in Fig. 9. There will be a record in the foreign language file 112 for each combination of foreign languages that may be required for any flight segment.

Provision has been made in the preferred embodiment of the cabin management data base 49 for the storage of three types of messages or means for management to communicate with the flight crew or other employees aboard the aircraft. The first category of messages is termed "general message" and would typically include such information that would be pertinent on a company wide basis such as the purchase of new aircraft or new corporate policies. The general messages are accessed by means of the general data base file 106 which has a general message field 106Q that having a structure similar to field 106M indicating those records in the general message file 114 of Fig. 10 which would be applicable to a particular flight segment. As shown in Fig. 10, the general message file 114 is comprised of a number of records each one having a field that indicates the origin date 114A and origin time of the general message along with an identification of the originator in field 114C. Also a field 114D is provided to

store the purge date of the general message and a field 114E that contains the text of the general message. In normal operation of the cabin management system, the general message will be displayed only if the present date is prior or equal to the purge date in field 114D. In the preferred embodiment of the invention, the text field 114E will contain a maximum of 1,024 alphanumeric characters with a maximum of 25 records in the general message file 114.

Likewise, provision is made for displaying special messages that are only applicable to that particular flight segment on a particular date. To that end, a field 106P in the general date base 106 is provided that contains a key accessing the pertinent records from the special message file 116 as illustrated in Fig. 11. The structure and operation of the special message file 116 is the same as the general message file 114 of Fig. 10. Except that an additional field 116A is provided to store the date that the special message applies.

In a manner similar to the special message provision, the cabin management data base 149 also provides for destination messages which contain information applicable to the arrival station or airport for a particular flight segment. As with the general messages and special messages, provision is made in the general data base file 106 for a field 106S which contains keys to access the pertinent destination messages from the destination message file 118 of Fig. 12 for a particular flight segment. The structure and operation of the destination message file 118 is the same as the general message file 114 and the special message file 116.

In many international flights, a variety of currencies are used aboard the aircraft to purchase various items such as drinks or goods offered in inflight sales. Since different currencies in different parts of the world, along with exchange rates that can vary on a daily basis in some cases, complicate the flight attendant's work substantially, provision is made in the cabin management data base 49 for displaying information relating to the appropriate currencies and exchange ratios to be used on a particular flight segment. This is accomplished by providing a field 106T in the general data base 106 that contains a key to the appropriate records in the currency file 120 for a particular flight segment. As with field 106M, the field 106T in the general data base record 107A-107D will include a first digit (NO OF RECS) that represents the number of different currencies to be handled on the flight segment and the remaining digits in the field 106T represent the record numbers for those currencies in the currency file 120. Thus, it is possible to display to the flight crew a number of different currencies that would be appropriate for that particular flight segment. The currency file 120 in turn is composed of a number of different fields including a first field 120A that contains the date at which the currency information was entered into the currency file 120. The second field 120B contains the name of the country and the third field 120C contains the name of the currency such as the Franc for France or the Pound for Great Britain. The currency exchange ratio as of the date of entry 120A is stored in a field 120D. Along with the currency ratio in field 120D, provision is made for displaying rounded off equivalents for specified dollar amounts. In the example shown in Fig. 13, the equivalent for $1.00 in ANTIGUA EC dollars is provided in a field 120E

which in this case is EC $3.00 and for the Australian Dollar, it would be Australian $1.15. In a similar manner, provision is made for the equivalent of U.S. $2.50 and U.S. $3.00 in fields 120F and 120G which as shown in Fig. 13 would correspond to EC $7.50 and EC $9.00 respectively. The amounts of $1.00, $2.50 and $3.00 are selected since they represent the typical transaction for the price of a drink or headset that the flight attendants deal with most frequently.

Information relating to inflight sales is also stored in the cabin management data base 149 and accessed for particular flight segments by means of a field 106U in the general data base 106 for a particular flight segment. The field 106U contains a number which again is composed of a first digit that indicates the number of appropriate records in the inflight sales file 122 of Fig. 14 to be accessed for a particular flight segment. The remaining digits in the inflight sales field 106U of the general data base represent the particular records which contain the information relating to the type of goods to be sold in that particular flight segment. The inflight sales file 122 is organized in such a manner that each record contains a field 122A that contains a description of the type of goods, a field 122B that contains the units in which the goods will be sold, a field 122C that contains the cost of the goods, a field 122D that contains the product identification number and a field 122E which contains the name of the particular good to be sold as identified in that record. With this information contained in the inflight sales file 122, it is possible to display to the flight attendants the full information with respect to the types of goods to be sold for any particular flight segment.

One type of information that can be particularly useful to the flight crew is a list of discrepancies in the equipment aboard that particular aircraft. This is provided by storing in the discrepancy file 124 a list of defective equipment or problems that exist on the aircraft. In the example of the discrepancy file 124 shown in Fig. 15, a first field 124A is used to describe the nature of the problem such as a broken seat or a lack of magazines on the aircraft. Fields 124B and 124C indicate the time and the date at which the discrepancy was logged with fields 124D and 124E indicating the flight number and the sector upon which the problem was logged. Since discrepancies relate to the particular aircraft and not a flight segment, it is not necessary to use the general data base to access this file.

In the cabin management data base 49 as illustrated in Fig. 5, the general data base 106 and the auxiliary data base files 108-126 are primarily concerned with storing what is termed global information that is applicable to the airlines flight operations in general. As described above, the general data base file 106 contains individual records 106A-106D that defines global data relating to a specific flight segment by either storing that data in the flight segment record itself or by utilizing a key or disk file address to access a predetermined record in one of the auxiliary data base files 108-126.

A second type of data which can be termed flight operational data, is utilized by the preferred embodiment of the cabin management system. In the cabin management data base 49 illustrated in Fig. 5 the flight operational data is stored in a flight history data base file indicated

at 128. An example of a flight history data base file is provided in Figs. 16A, 16B and 16C. As shown in Figs. 16A, 16B and 16C the flight history data base file 128 is composed of a number of records indicated by reference numerals 130 and 132. In normal operation, there will be one flight history data base record 132 for each flight segment which is utilized to accumulate operational data for that particular flight segment. Although only two flight history data base records 130 and 132 are shown in Figs. 16A, 16B and 16C, the flight history data base file 128 which contain as many records as necessary to store the data accumulated on various flight segments until that data can be transferred to a ground base computer and is no longer required to be stored on the aircraft. In those cases where the flight segment operational data is immediately transmitted to a ground base computer after each flight segment, only one flight history data base record 130 would be required in the system.

As may be appreciated from viewing Figs. 16A, 16B and 16C, each flight history data base record 130 and 132 contains a large amount of data. Each record in the flight history data base file 128 is identified by a flight history data base (FHDB) identifier. In the event there is more than one flight history data base record 130, 132, it will be necessary to identify that record. In Fig. 16A, this identification is accomplished by the FHDB identification field 134 which contains the same basic flight segment identification data stored in the general data base records including the departure airport, arrival airport, flight number, aircraft type and service base. In addition, the departure time and arrival time, along with flight time, can be part of the FHDB identifier. Thus, in

the operation of the cabin management system, the FHDB identifier can be used as a key to access the disk file address of the flight history data base record containing the operational information for a particular flight segment. In the example shown in Fig. 16A, the flight history data base records 130 and 132 will include an offload field 136 that indicates the date and time that the information contained in that particular flight history data base record is transmitted to a central computer or loaded onto a floppy disk for transfer to a ground based central computer. A field (which is not shown) similar in configuration to the offload field 136 is utilized to store the date and time that that particular record has been initialized which usually occurs during the sign on process which will be discussed in a subsequent portion of this description.

Each flight history data base record also includes fields for storing the flight number, aircraft type and tail number of the particular aircraft in which the cabin management system is installed. These fields respectively, as shown in Fig. 16A are 138, 140 and 142. The departure airport for a flight segment is stored in a field 144 and the final airport for that flight segment is stored in a field 146. In the event there is one or more intermediate airports for that particular flight segment, their identifiers may be stored in the field indicated at 148 in the flight history data base record.

The name, employee number and base of the supervising first class flight attendant or purser is stored in a field 150 as is the name, employee number and base of the supervising flight attendant or purser in economy class.

Information that is to be entered into the flight history data base prior to departure on a flight segment is stored in fields that are generally designated as DEPARTURE 1, DEPARTURE 2, DEPARTURE 3 and DEPARTURE 4 which are indicated in Fig. 16A by the respective reference numerals 152, 154, 156 and 158. In the DEPARTURE 1 field 152, there are subfields that are used to store the number of liquor kits in first class 160, the number of carts in first class and business class 162, the number of coolers in first class and business class 164 along with the identification of the station at which the kits and carts were packed in field 166 and the employee number of the individual who packed the first class kits and carts in field 168. In the particular embodiment of the invention shown in Fig. 16A, there is also a field 170 for a flag to indicate whether or not the liquor is in bond or has been taxed. The DEPARTURE 1 field 152 also includes subfields F5 at 172 and L2 at 174 in which the first five digits and last two digits of the seal numbers for the liquor kits that have been loaded in first class are stored. Similarly, fields 176 and 178 contain the same information with respect to seal numbers.

The DEPARTURE 2 field 154 contains a number of subfields including a subfield 180 in which the departure inventory of fifths of liquor in first class are stored, a field 182 in which the beginning inventory of tenths of liquor in first class are stored, a field 184 in which the beginning inventory of miniature bottles of liquor in first class are stored, a field 186 in which the beginning inventory of wine in first class is stored, a field 188 in which the beginning inventory of beer in first class is stored and a field 190 in which a beginning inventory of complimentary cigarettes in first class is stored. In a

similar manner, fields 192, 194 and 196 are used to store the departure or beginning inventory of liquor minis, wine and beer in business class.

The DEPARTURE 3 field 156 includes subfields that contain the beginning or departure inventory for economy class including subfield 198 which includes the number of liquor kits, subfield 200 listing number of serving carts, subfield 202 listing the number of coolers and subfield 204 containing the identifier of the station or airport where the departure was packed and the employee number of the individual who did the packing in field 206. As with the DEPARTURE 1 field 152, there are fields 210, 212, 214 and 216 for storing the first five digits and the last two digits of the seals applied to the liquor kits.

The DEPARTURE 4 field 158 includes the departure or beginning inventory for the economy class minis in a subfield 218, a subfield 220 for the economy class wine, a subfield 222 for the economy class beer, a subfield 224 for the number of headsets to be sold in economy class and similarly in field 226 the number of cigarettes in economy class.

In the portion of the flight history data base file shown in Fig. 16B, there are four fields ARRIVAL 1, ARRIVAL 2, ARRIVAL 3 and ARRIVAL 4 that are used to store the ending inventory or the inventory of various items on an aircraft at the end of a flight segment. As may be seen by comparing the arrival fields 228, 230, 232 and 234 with the departure fields 152, 154, 156 and 158 of Figs. 16A, the same general information or fields for storing inventory counts is provided in the arrival fields.

Also, as shown in Fig. 16B, the flight history data base file includes a field for the amount of currency received from the first class and business class passengers. This field is broken down into a number of subfields as illustrated by subfield 238 and subfield 240 which indicate the country of the currency and the amount of currency in that country's money. In the preferred embodiment of the invention, the identification of the country in subfield 238 is represented as a code that may be used as a key or disk file address to access information about that country's currency from the currency file 120 of Fig. 13. As shown in Fig. 16B, this embodiment of the invention makes provision for recording or storing currency from five different countries.

Provision is also made in the flight history data base file as shown in Fig. 16B for a count of the number of first class, business class and ecomony class passengers in fields 242, 244, ad 246 respectively. Each of these passenger count fields 242, 244 and 246 is broken down into subfields as illustrated by fields 248, 250 and 252 which provide for the storing of the passenger count for the departing airport, intermediate airports and the final airport respectively.

In the particular embodiment of the invention shown in Fig. 16B, a field 254 is provided for storing the currency received from the economy class passengers. The structure of this field is identical to the structure of the currency received field 236. The portion of the flight history data base file shown in Fig. 16B also includes a field 256 and a field 258 for storing the value in U.S. dollars of the currency received in first and business

class and the currency received in economy class respectively. The contents of each of the five subfields in the currency fields 256 and 258 represents the U.S. dollar amount of the foreign currency stored in the amount subfields represented by 240. The U.S. dollar equivalent stored in fields 256 and 258 is computed utilizing the conversion ratio contained in field 120D of the currency file of Fig. 13.

The final portion of the flight history data base file illustrated in Fig. 16C includes fields in each record 130 and 132 in which the usage of the various inventory items recorded in the departure fields 152, 154, 156 and 158 and the arrival fields 228, 230, 232 and 234 is stored. Usage figures for first class and business class are stored in field 260 and as such represents the number of fifths of liquor in field 262, the number of tenths of liquor in field 264, the number of minis in 266, the number of bottles of wine in 268, the number of bottles of beer in 270 along with the number of complimentary cigarettes used in the flight segment. In a similar manner, the number of liquor minis used in business class is stored in field 274 along with the business class wine and beer useage in fields 276 and 278. The usage of minis, wine, beer, headsets and cigarettes for economy class is stored in a similar manner in a field 280. Since liquor, headsets and cigarettes are typically sold in economy class as opposed to being distributed free of charge in first and business class, provision is made in the flight history data base file of Fig. 16C in a field 282 to store the value in dollars of the minis, wine, beer, headsets and cigarettes used in field 280. The dollar value of the various items

sold in economy class can be obtained from the in flight sales file 122 of Fig. 14.

The overall logic of the programs stored in field 104 of the data base 49 of Fig. 5 that operate the cabin management system is illustrated in the logic diagram of Fig. 17. At power up as indicated by the arrow 300, a title is displayed on the CRT or flat screen display unit 55 of the terminal shown in Figs. 4 and 21. Preferrably, this display will appear automatically when aircraft power becomes available so that the title display will be generated on the display 55 without the requirement that the display or terminal unit be switched on by a flight crew member. The generation of this display is indicated by logic box 302 in Fig. 17. The display itself may be any appropriate display that preferrably indicates the nature of or identifies the system and provides an instruction to an operator for the next step. Typical instructions may be to unlock and pull out the keyboard 53 from the terminal shown in Fig. 21 and instructions to slide the employees magnetic I.D. card through the magnetic card reader 60. In response to a valid card, the system will automatically as indicated by arrow 304, generate a menu display on the display unit 55 as indicated by block 306. It should be appreciated that the programs for accomplishing the logic illustrated in Fig. 17 will be stored in the management program file 104 of the cabin management data base which in turn is stored on the disk file 49 as shown in Fig. 21 as well as Fig. 4.

In the preferred embodiment of the invention the menu display will be of the form indicated below which includes

at the top a header portion that identifies the flight segment.

```
                                   MENU
---------+---------+---------+---------+---------+---------+------
LAX   12:15pm  07  SEP    LHR   8:15pm  07 SEP    GMT 20:15  07 SEP
MENU

            SIGN-ON
            PRE-FLIGHT BRIEFING
            DEPARTURE INVENTORY
            PASSENGER BOARDED
            CURRENCY CONVERSION
            ARRIVAL INVENTORY
            EQUIPMENT DISCREPANCIES
            INVENTORY CLOSE-OUT
            CURRENCY CLOSE-OUT
            IN-FLIGHT SALES REPORT
            END OF FLIGHT

-------------------------------------------------------------------
   Select the desired option by using the up or down arrow keys.
     Execute the selected option by pressing the "RETURN" key.

PROMPTS:
   Select the desired option by using the up or down arrow keys.
     Execute the selected option by pressing the "RETURN" key.
```

It should be noted that the portion of the header indicating the departure and arrival airports will not be completed until after the sign on procedure indicated at box 308 has been completed.

At this point, the only permitted selection from the above menu permitted by the logic in box 306 will be the signon logic 308 as indicated by arrow 310.

When the signon logic of box 308 has been selected by, for example, pressing a "RETURN" key on the keyboard 53, a display will be generated on the display unit 55 which would ask:

ARE YOU THE FIRST CLASS PURSOR?

If the response typed in by the operator is yes for example by pressing a "Y" key on the keyboard 53, the following display will be produced on the display unit 55.

FIRST CLASS PURSER SIGN-ON

```
--------+--------+--------+--------+--------+--------+-------
                                          GMT   20:15   07 SEP
FIRST CLASS PURSER SIGNON

        First Class Purser Name:  CAROLE JACKSON
                Employee Number:  56803
                    Purser Base:  LAX
                  Flight Number:  515
                           From:  LAX
                             To:  JFK
                             To:  LHR

-------------------------------------------------------------------

Please type your FULL NAME:  CAROLE JACKSON

PROMPTS:

Please type your FULL NAME:
Please type your EMPLOYEE NUMBER:
Please type your BASE CODE:
```

05 In the above illustrated display, the portions after the colon in capital letters represent the information entered by the operator. After the return key has been pressed by the operator, the following economy class signon display will be generated on the display unit 55.

ECONOMY CLASS PURSER SIGN-ON

```
---------+---------+---------+---------+---------+---------+-------
                                          GMT   20:15   07 SEP

ECONOMY CLASS PURSER SIGN-ON

       Economy Class Purser Name:  JACKIE SMITH
                  Employee Number:  84381
                      Purser Base:  MIA
                    Flight Number:  515
                             From:  LAX
                              To:  JFK
                              To:  LHR

-------------------------------------------------------------------

Please type FULL NAME:

PROMPTS:

Please type your FULL NAME:
Please type your EMPLOYEE NUMBER:
Please type your BASE CODE:

THE FOLLOWING PROMPTS ARE NOT DISPLAYED IF ALREADY ENTERED BY FC
PURSER.

Please type your FLIGHT NUMBER:
Please type the DEPARTURE CODE:
Please type the INTERMEDIATE CODE (Press RETURN for none):
Please type the DESTINATION CODE:
```

Again, in the above illustrated display, the portions after the colon in capital letters represent the information entered by the operator. As can be seen from the above prompts, either the economy class or the first class purser will be required to type in the flight number, departure code, intermediate codes and destination codes which will serve to identify the flight segment to the system.

At this point it should be noted that the signon logic can include logic to access the invalid employee

number file 126 in the cabin management data base 49 as shown in Fig. 5 so that the validity of the employee numbers typed into the system by the operator can be determined. After signon has been completed, the menu will be automatically displayed on the display unit 55 as indicated by arrow 312 of Fig. 17.

Typically the next selection from the menu will be the PRE-FLIGHT BRIEFING as indicated by arrow 314 in the logic diagram of Fig. 17. The PRE-FLIGHT BRIEFING as indicated in Fig. 17 by logic box 316 will cause the display shown in Fig. 20 to be generated on the display unit 55. The first line of the PRE-FLIGHT BRIEFING shown in Fig. 20 is the header which generates the airport identification codes for the departure station, in this case LAX for Los Angeles International Airport and JFK for Kennedy Airport in New York. The generation of this header display is illustrated in detail in the logic shown in Figs. 18 and 19. As shown in Fig. 18, a hardware clock 318 is provided in the cabin management system. The outputs of the hardware clock 318, as illustrated in Fig. 18, includes signals on lines 320, 322, 324 and 326 respectively that represent GMT in hours (GMTHR), GMT in minutes (GMTMIN), GMT in days (GMTDAY) and GMT in months (GMTMNTH). Signals representing these quantities are input into a GMTSET logic system indicated at block 328 along with quantities on lines 330 and 332 from the appropriate flight segment record in the general data base 106 as indicated by arrow 334 that define respectively the difference in hours from the departure station time to GMT and the difference in hours from the destination station, in this case LHR to GMT. As further shown in Fig. 18, these quantities are converted by the GMTSET logic 328 into quantities that

represent the time, day and month at the departure station LAX and the destination station LHR in GMT. These quantities indicated generally by reference numeral 336 are then applied to a header logic 338 that generates the header 340 shown in Fig. 19. Thus, a header can be automatically generated for each display where the basic information is stored in the HEADIS logic 338 of Fig. 18 without the necessity of recomputing this information for separate displays.

Thus, the briefing logic 316 of Fig. 17 utilizes the information generated in the header display logic in Fig. 18 in combination with the basic flight segment information available in the general data base file 106 and the auxiliary data base files of Figs. 7-15 to generate the appropriate briefing information for the flight crew for that particular flight segment.

After the basic pre-flight briefing display of Fig. 20 has been produced on the display unit 55, the operator by pressing the CONTINUE key will cause the system as indicated by arrow 342 to display whatever general messages that may apply to the flight segment from the auxiliary data base file 314 on the display unit 55. This logic is indicated at box 344 of Fig. 17.

After the general messages if any have been displayed pressing the CONTINUE key by the operator will cause, as indicated by arrow 346 of Fig. 17, the system to display any special messages that might be appropriate for the flight segment. This logic is indicated at box 348 of Fig. 17. An example of a special message display is provided below.

PRE-FLIGHT BRIEFING / SPECIAL MESSAGES

LAX 12:15pm 07 SEP JFK 8:15pm 07 SEP GMT 20:15 07 SEP
SPECIAL MESSAGES FOR FLIGHT 116

SPECIAL FILM OFFERINGS

ZONE 1:	FLASHDANCE	PG 1:36
ZONE 2:	THE MIRROR CRACKED	PG 1:45
ZONE 3:	MAX DUGAN RETURNS	PG 1:38
ZONE 4:	BEST FRIENDS	PG 1:50
ZONE 5:	TOOTSIE	PG 1:56

Press CONTINUE key to continue! Press MENU key to return to menu!

PROMPTS:

Press CONTINUE key to continue! Press MENU key to return to menu!

By the same token, destination information can be automatically produced as indicated by arrow 350 on the display unit 55. An example of a destination display is provided below.

PRE-FLIGHT BRIEFING / DESTINATION INFORMATION

LAX 12:15pm 07 SEP JFK 8:15pm 07 SEP GMT 20:15 07 SEP
DESTINATION INFORMATION FOR FLIGHT 116 FROM: LAX TO: JFK

JOHN F. KENNEDY AIRPORT NEW YORK, NEW YORK USE HAS JETWAYS

CREW ARRIVAL PROCEDURES: OUT BASED PURSERS TO CHECK WITH CREW DESK

CREW BREIFING PROCEDURES: ROOM 1236-WORLDPORT, directly across the street from international arrival area.
DISTANCE TO CITY: 16 MILES
DUTY FREE SHOP: OPEN FROM 0730 UNTIL 45 MINUTES PRIOR TO LAST AIRCRAFT DEPARTURE
GROUND TRANSPORTATION: BUS, SUBWAY, TAXI HOTELS AT AIRPORT
PURSER DEPOSITORY LOCATION: South concourse departure level adjacent to Citybank
MESSAGE BOARD FACILITIES: yes OPERATION PHONE NUMBER 632-4090
RENT-A-CAR: yes RESTAURANTS: yes
MISCELLANEOUS: Helicopter service; Free of charge to FC and BC PAX to NYC and EWR and return.

PROMPTS:

Press CONTINUE key to continue! Press MENU key to return to menu!

As indicated in the logic of Fig. 17 once the pre-flight briefing sequence has been completed, the menu as indicated at logic box 306 will then again be displayed on the display unit 55.

At this point in the preferred embodiment of the invention, the operator will have full freedom to select the various procedures indicated by the arrows eminating from the menu logic box 306 as shown in Fig. 17.

In normal airline operation, the operator would select as indicated by arrow 354 in Fig. 17 from the menu the departure inventory logic. The first portion of the departure logic as indicated by box 370 is the production on the display unit 55 of a display of the type shown below.

FIRST CLASS AND BUSINESS CLASS DEPARTURE INVENTORY

```
---------+---------+---------+---------+---------+---------+-------
LAX   12:15pm  07 SEP   LHR   8:15pm  07 SEP   GMT   20:15  07 SEP
FIRST CLASS AND BUSINESS CLASS DEPARTURE INVENTORY.

KITS: 23  CARTS: 10  COOLERS: 20  PACKED AT: LAX  BY # 345678

          1st 5 Digits              Last 2 Digits
DEPARTURE  12345  :  11,12,13,14,15,16,17,18,19,20,21,22,23,23,24
SEAL NOS.  67890  :  42,43,44,45,46,47,48,49,50,51,52,53,54,55,56
           69696  :  21,22,23,24,25,26,27,28,29,30,31,32,33,34,35

NUMBER OF FIRST CLASS LIQUOR 5ths.....................25
NUMBER OF FIRST CLASS LIQUOR 10ths....................10
NUMBER OF FIRST CLASS MINIS..........................999
NUMBER OF FIRST CLASS WINE/CHAMPAGNE.................88
NUMBER OF FIRST CLASS BEER (12oz.)....................12
NUMBER OF COMPLIMENTARY CIGARETTES - 4's.............10
NUMBER OF BUSINESS CLASS LIQUOR MINIS...............525
NUMBER OF BUSINESS CLASS WINE/CHAMPAGNE.............789
NUMBER OF BUSINESS CLASS BEER (12oz.)...............25

-------------------------------------------------------------
```

Please type whether these items are TAX PAIR or INBOND (T or I):

PROMPTS:

Please type the FC/BC LIQUOR KITS COUNT:
Please type the FC/BC CART COUNT:
Please type the FC/BC COOLER COUNT:
Please type the CATERING SUPPLY LOCATION:
Please type the PACKER EMPLOYEE NUMBER:
Please type whether these items are TAX PAIR of INBOND (T or I):

Type FC/BC DEPARTURE SEAL NO. 1st 5 digits:
Type FC/BC DEPARTURE SEAL NO. last 2 digits:
Type FC beginning LIQUOR 5ths:
Type FC beginning LIQUOR 10ths:
Type FC beginning MINIS:
Type FC beginning WINE/CHAMPAGNE:
Type FC beginning BEER (12oz.):
Type FC beginning CIGARETTES (4's):
Type BC beginning MINIS:
Type BC beginning WINE/CHAMPAGNE:
Type BC beginning BEER (12oz.):

As can be seen from the display above, the logic in box 370 responding to the inputs by the system operator will cause the loading of the departure inventory information into the departure fields 152, 154, 156 and 158 of the flight history data base file 128 as illustrated in Fig. 16A.

Once the first class departure inventory has been completed, the logic of the system as indicated by arrow 372 will initiate the economy class departure inventory logic represented by box 374 of Fig. 17. This will cause the generation on the display unit 55 of the display below.

ECONOMY CLASS DEPARTURE INVENTORY

```
---------+---------+---------+---------+---------+---------+-------
LAX   12:15pm  07 SEP   LHR   8:15pm  07 SEP   GMT   20:15  07 SEP
ECONOMY CLASS DEPARTURE INVENTORY.

KITS: 23  CARTS: 10  COOLERS: 20  PACKED AT: LAX  BY # 345678

          1st 5 Digits              Last 2 Digits
DEPARTURE  12345  :  11,12,13,14,15,16,17,18,19,20,21,22,23,23,24
SEAL NOS.  67890  :  42,43,44,45,46,47,48,49,50,51,52,53,54,55,56
           69696  :  21,22,23,24,25,26,27,28,29,30,31,32,33,34,35

NUMBER OF ECONOMY CLASS MINIS.....................999
NUMBER OF ECONOMY CLASS INTERNATIONAL WINE.....100
NUMBER OF ECONOMY CLASS BEER (12oz.).............999
NUMBER OF ECONOMY CLASS DOMESTIC WINE............888

NUMBER OF SALEABLE HEADSETS .....................525
NUMBER OF SALEABLE PACKS OF CIGARETTES...........425

-----------------------------------------------------------------

Please type the CATERNG SUPPLY LOCATION:

PROMPTS:

Please type the EC LIQUOR KITS COUNT:
Please type the EC CART COUNT:
Please type the EC COOLER COUNT:
Please type the CATERING SUPPLY LOCATION:
Please type the PACKER EMPLOYEE NUMBER:
Please type whether these items are TAX PAID or INBOND (T or I):
Type EC DEPARTURE SEAL NO. 1st 5 digits:
Type EC DEPARTURE SEAL NO. last 2 digits:
Type EC beginning MINIS:
Type EC beginning INTERNATIONAL WINE:
Type EC beginning BEER (12oz.):
Type EC beginning DOMESTIC WINE:
Type EC beginning SALEABLE HEADSETS:
Type EC beginning SALEABLE CIGARETTES PACKS:
```

As with the first class departure inventory, the economy class departure inventory logic 374 will load the information entered into the above display into the arrival fields 230, 232, 234 and 228 of the flight history data

base file 128 as shown in Fig. 16B. After the economy class departure inventory has been completed by the operator, the system will automatically exit, as indicated by arrow 376 to the menu logic 306.

Either before or after the departure inventory, the system operator can select the menu item PASSENGER BOARDED to load the number of passengers boarded at the departure or intermediate airports into the flight history data base file in fields 242, 244, and 246 as shown in Fig. 16B. This logic would be initiated over line 360 and performed as indicated by box 378 in Fig. 17.

At any time during the flight, the system operator will be able using the menu to initiate the currency conversion logic as indicated at box 380 of Fig. 17. The currency conversion logic of 380 will produce a screen display of the type shown below utilizing the currency data contained in the currency file 120 shown in Fig. 13. As indicated before, the appropriate records in the currency file 120 can be accessed by utilizing the flight segment information to obtain the appropriate records from the general data base file of Fig. 6.

CURRENCY CONVERSION

LAX 12:15pm 07 SEP LHR 8:15pm 07 SEP GMT 21:15 07 SEP
CURRENCY CONVERSION

LAST UPDATED 22:15 23 MAR 83

COUNTRY	CURRENCY	=$1.00	=$1.50	=$2.50	=$3.00
UNITED KINGDOM	POUND	0.50	0.75	1.25	1.50
GERMANY	DEUTSCHEMARK	2.60	3.90	6.50	7.80
FRANCE	FRANC	8.00	12.00	20.00	24.00

Type the name of additional country: AUSTRALIA (Press MENU to EXIT)

PROMPTS:

Type the name of additional country: (Press MENU to EXIT)

The system operator will also have the option utilizing the menu to call up a display utilizing the logic of box 382 representing equipment discrepancies. The discrepancies display would display on the display unit 55 the information contained in Fig. 15 and permit the operator to either delete or add additional discrepancies.

At the end of the flight segment, the system operator would select from the menu display the arrival inventory operation as indicated by arrow 386 in Fig. 17. The first operation as indicated by logic box 384 is the production of a first and business class arrival inventory display of the type shown below.

FIRST CLASS AND BUSINESS CLASS ARRIVAL INVENTORY

LAX 12:15pm 07 SEP LHR 8:15pm 07 SEP GMT 20:15 07 SEP
FIRST CLASS AND BUSINESS CLASS ARRIVAL INVENTORY

KITS: 23 CARTS:10 COOLERS: 20 TAX PAID

	list 5 digits	last 2 digits
ARRIVAL	17777 :	11,12,13,14,15,16,17,18,19,20,21,22,23,24
SEAL NOS	22145 :	41,42,43,44,45,46,47,48,49,50,51,52,53,54
	54321 :	67,68,69,70,71,72,73,74,75,76,77,78,79,80

REMAINING NUMBER OF FULL FIRST CLASS LIQUOR 5ths.....25
REMAINING NUMBER OF PARTIAL FIRST CLASS LIQUOR 5ths..... 2
REMAINING NUMBER OF FULL FIRST CLASS LIQUOR 10ths.....10
REMAINING NUMBER OF PARTIAL FIRST CLASS LIQUOR 10ths..... 1
REMAINING NUMBER OF FIRST CLASS MINIS.....999
REMAINING NUMBER OF FIRST CLASS WINE/CHAMPAGNE.....88
REMAINING NUMBER OF FIRST CLASS BEER (12oz.).....12
REMAINING NUMBER OF COMPLIMENTARY CIGARETTES - 4's.....10

(16)

Type FC/BC ARRIVAL SEAL NO. 1st 5 digits: - 17777

PROMPTS:

Type FC/BC ARRIVAL SEAL NO. 1st 5 digits:
Type FC/BC ARRIVAL SEAL NO. last 2 digits:
Type remaining FC FULL LIQUOR 5ths:
Type remaining FC PARTIAL LIQUOR 5ths:
Type remaining FC FULL LIQUOR 10ths:
Type remaining FC PARTIAL LIQUOR 10ths:
Type remaining FC MINIS:
Type remaining FC WINE/CHAMPAGNE:
Type reamining FC BEER (12oz.):
Type remaining CIGARETTES (4's):

When the arrival inventory information has been entered by the operator, it will be automatically input by the logic shown in box 384 to fields 228 and 230 of the flight history data base file as shown in Fig. 16B. Once
05 this has been completed, the system logic as indicated by arrow 386 will initiate the logic in box 388 to produce an ecomony class arrival inventory display on the display unit 55 of the type shown below.

ECONOMY CLASS ARRIVAL INVENTORY

LAX 12:15pm 07 SEP LHR 8:15pm 07 SEP GMT 20:15 07 SEP
ECONOMY CLASS ARRIVAL INVENTORY

KITS:23 CARTS:10 COOLERS:20 PACKED AT:LAX BY #345678 TAX PAID

	list 5 digits	last 2 digits
ARRIVAL SEAL NOS	55667 :	11,12,13,14,15,16,17,18,19,20,21,22,23,24
	93321 :	41,42,43,44,45,46,47,48,49,50,51,52,53,54
	10000 :	07,08,09,10,11,12,13,14,15,16,17,18,19,20

REMAINING NUMBER OF ECONOMY CLASS MINIS.....999
REMAINING NUMBER OF ECONOMY INTERNATIONAL WINE.....100
REMAINING NUMBER OF ECONOMY BEER (12oz.).....999
REMAINING NUMBER OF ECONOMY DOMESTIC WINE.....888
REMAINING NUMBER OF SALEABLE HEADSETS.....444
REMAINING NUMBER OF SALEABLE PACKS OF CIGARETTES.....425

PLEASE TYPE THE REMAINING NUMBER OF SALEABLE HEADSETS: 444

PROMPTS:

Type EC ARRIVAL SEAL NO. 1st 5 digits:
Type EC ARRIVAL SEAL NO. last 2 digits:
Type remaining EC MINIS:
Type remaining EC INTERNATIONAL WINE:
Type remaining EC BEER (12oz.):
Type remaining EC DOMESTIC WINE:
Type remaining EC SALEABLE HEADSETS:
Type remaining EC SALEABLE CIGARETTE PACKS:

As with the first class arrival inventory, the information in the above display will be input by the logic 388 into fields 232 and 234 of the flight history data base file 120.

Also at the end of the flight segment, the system operator can select the inventory close out procedure from the menu which will initiate as indicated by line 358 of Fig. 17 the logic of box 390. For the first class inventory close out, the display shown below will be generated on the display unit 55.

FIRST CLASS AND BUSINESS CLASS INVENTORY CLOSEOUT

LAX 12:15pm 07 SEP LHR 8:15pm 07 SEP GMT 20:15 07 SEP
FIRST CLASS AND BUSINESS CLASS INVENTORY CLOSEOUT

	FIRST CLASS						BUSINESS CLASS			
	LIQUOR 5ths	LIQUOR 10th	LIQUOR MINIS	WINE/ CHAMP. 750ml	BEER 12oz	CIG 4's	LIQUOR MINIS	WINE/ CHAMP. 187ml	BEER 12oz
DEPARTURE	.0	.0							
ARR. FULL	.0	.0							
ARR. PART	.0	.0							
ARRIVAL	.0	.0							
USAGE	.0	.0							

Please VERIFY your INVENTORY as shown above! IF CORRECT use ACCEPT key, or press MENU key and select either DEPARTURE or ARRIVAL INVENTORY and type correct entry.

PROMPTS:

Please VERIFY your INVENTORY as shown above! IF CORRECT use ACCEPT key, or press MENU key and select either DEPARTURE or ARRIVAL INVENTORY and type correct entry.

When the first class inventory has been verified as indicated by the above display, the system will automatically as indicated by arrow 392 initiate the operation of the ecomony class close out shown in box 394.

05 This will produce a display as indicated below.

ECONOMY CLASS INVENTORY CLOSEOUT

LAX 12:15pm 07 SEP LHR 8:15pm 07 SEP GMT 20:15 07 SEP
ECONOMY CLASS INVENTORY CLOSEOUT

	ECONOMY					
	LIQUOR MINIS	INTERNAT. WINE	BEER	DOMESTIC WINE	HEADSETS	CIGARETTE
VALUE	$2.50	$1.50	$1.50	$1.50	$3.00	$1.00
DEPARTURE						
ARRIVAL						
USAGE						
USAGE VALUE						

Please VERIFY your INVENTORY as shown above! IF CORRECT use ACCEPT key, or press MENU key and select either DEPARTURE or ARRIVAL INVENTORY and type correct entry.

PROMPTS:

Please VERIFY your INVENTORY as shown above! IF CORRECT use ACCEPT key, or press MENU key and select either DEPARTURE or ARRIVAL INVENTORY and type correct entry.

Once the economy inventory has been verified, the system will automatically exit back to the menu logic 306.

Along with the inventory close out, a currency close out function indicated by box 396 in Fig. 17 can be
05 initiated by selecting the currency close out option from the menu. A display will be generated by the logic of box 396 for the first class currency close out of the type illustrated below.

FIRST CLASS AND BUSINESS CLASS CURRENCY CLOSEOUT

LAX 12:15pm 07 SEP LHR 8:15pm 07 SEP GMT 20:15 07 SEP
FIRST CLASS AND BUSINESS CLASS CURRENCY CLOSEOUT

CURRENCY COLLECTED

COUNTRY	AMOUNT	X	XCHG RATE	TOTAL
USA	99999.99	X	1.00	99999.99
UNITED KINGDOM	99999.99	X	.50	99999.99
GERMANY	99999.99	X	2.30	99999.99
FRANCE	99999.99	X	7.00	99999.99
		X		
		X		
		X		

DEPOSIT AMOUNT

PROMPTS:

Type the AMOUNT OF US CURRENCY collected:
Type the name of any additional country or press "RETURN":
Type the AMOUNT OF XXXXXXX CURRENCY collected:
Type the NUMBER OF FC PASSENGERS from XXX to YYY:
Type the NUMBER OF BC PASSENGERS from XXX to YYY:

After the first class currency close out has been completed, a similar display will be generated for the economy class currency close out.

At the end of the flight segment when all the various functions described above have been performed by the system operators who are usually members of the flight crew, the end of flight option is selected from the menu which initiates the logic indicated in box 398. One of the primary functions of the end of flight logic is to lock the data in the flight history data base so that changes can no longer be made by flight crew members thereby insuring that accurate data may be provided to management.

The preferred embodiment of an aircraft on-board terminal includes memory for storing the cabin management data base as illustrated in Fig. 5 as well as a display unit for displaying the type of data described above, a keyboard for entering the data into the memory and a magnetic card reader is provided in Fig. 21. A more detailed description of this terminal is provided in co-pending patent application Metz et al., Serial No. _____ filed _____. For purposes of this description, the elements in the terminal of Fig. 21 which are similar to the elements in the terminal illustrated in Fig. 4 are given the same reference numerals. The terminal as shown in Fig. 21 is enclosed by a housing 400 and includes a front panel 410. It is intended that the housing 400 of the terminal would normally be secured within the passenger portion of the aircraft cabin in such a manner that the front panel 410 would be accessible to members of the flight crew. Located in the upper right hand portion of the front panel 410 is

the visual display unit 55 which in the preferred embodiment of the invention is a flat panel display device. One of the fundamental considerations from an ergonomic standpoint is the legibility of the display in the aircraft cabin environment. The characters projected on the display unit 55 must be of sufficient size to be readily legible to the flight crew member operating the system; while at the same time the display unit 55 must display enough information to reduce to a minimum the necessity for scrolling or otherwise calling up additional data pages that would significantly add to the complexity of operating the system. With respect to the various displays discussed in the foregoing portion of this description of the invention, the preferred display permits the generation of eighty characters on twenty-four lines.

Also included in the front panel 410 is a keyboard door which in the view of Fig. 21 has been folded down underneath the keyboard 53 and hence is not visible in this figure. Included in the door is a lock that is provided to limit access to the keyboard to authorized personnel. Due to the fact that certain categories of information, particularly relating to on-board inventories, are of economic significance to the airlines, it is considered important to provide various means for limiting access to this information. The keyboard 53 includes special function keys indicated generally at 411 including a "RETURN" key, a "MENU" key, a "CONTINUE" key and an "ACCEPT" key to ease the operation of the system.

The front panel 410 also includes a printer door 412 behind which the printer 58 is normally located. In the preferred embodiment of the invention, the printer 58 is a

high speed, eg 2,000 characters per second, rotary electrically operated printer of the type disclosed in U.S. Patent 4,178,583. A high speed printer of this type has particular utility in that it permits any of the displays previously discussed to be printed out rapidly. For example, a print out of the destination message display would facilitate the reading of this information over the aircraft's public address system.

In the terminal shown in Fig. 21 as well as the terminal of Fig. 4, provision is made for inputting data by means of data cards. In particular, this feature is provided by the mark sense card reader 64 which accepts mark sense data cards from an aperture 414 and ejects the cards through the upper aperture 416.

As may be seen from Fig. 21, the printer 58 also includes a protective plate 418 configured with an arcuate slot 420 through which print-outs from the printer emerge.

The keyboard 53 is supported on a pair of tracks 422 and 424 which are secured to the housing 14 thereby permitting the keyboard to be slidably retracted into the housing 400 underneath the display unit 55. Included in the keyboard 53 is a magnetic card reader indicated generally at 60. The keyboard 53 is provided with a slot 426 through which a magnetic card can be entered into the magnetic card reader 60. One of the primary purposes of the magnetic card reader is to provide a means of operator identification or authorization so that the system can be limited to utilization by authorized personnel.

Secured within the housing 12 are a number of components including a power supply indicated at 428 for the printer 58 along with power supplies 429 for the other components in the printer.

In the rear portion of the terminal a number of printed circuit boards are secured within the housing 400. The printed circuit boards which are not visible in the cut away portion of the housing 400 include the microprocessor or microcomputer CPU 46 of Fig. 3 and associated circuitry. The microprocessor or microcomputer 46 utilizes the operating system programs 102 and the management programs 104 stored in the memory 49 of Fig. 5.

In the preferred embodiment of the invention, as illustrated in Fig. 21, the data base for the cabin management system 49 as illustrated in Fig. 5 is contained in the terminal and resides on the winchester disk 49. However, since an aircraft provides difficult environmental operating conditions for a winchester type disk drive such as the one shown at 49 of Fig. 21, consideration must be given to the mounting and orientation of the disk drive. In Fig. 21, the preferred orientation of the winchester disk drive in an aircraft is illustrated. The winchester disk drive 49 is shown in broken away form so that the major internal components of the system can be visualized. Included in the disk drive 49 are a plurality of fixed rotating hard disks indicated at 430. Inserted between the disks is a read/write head mechanism 432 which in turn is controlled in a stepper motor 434. Since it has been discovered that the most serious vibration in an aircraft is in the vertical or up and down direction which may typically occur during landing, the orientation of the disk

430 and the heads 432 in an essentially vertical position as shown in Fig. 4 will result in a significant number of misreads of digital data. Rotating the disk drive 49 90° so that the disks 430 are horizontal will substantially reduce the number of misreads resulting from aircraft vibration. However, when the disk drive is orientated in this manner, the system becomes subject to head crashes due to severe vibration in the vertical direction thereby resulting in potentially serious damage to the read/write heads 432 and the disks themselves 430. As a result, it is considered preferrable to orientate the winchester disk 49 as shown in Fig. 21 and to provide for substantial redundant reading capability under control of the operating system 102 of the cabin management data base 49.

In order to provide relatively large amounts of data in digital form to the data base 49 and to remove flight history data to a ground based computer, especially where data transmission means of the type shown in Fig. 3 are not available, a floppy disk drive 436 is provided. A suitable floppy disk drive assembly is the Sony 3.5 in. floppy disk drive having a data storage capacity of approximately 160 kilobites. As shown in Fig. 21, the micro floppy disk drive is secured to the upper left hand portion of the housing 400 behind the printer disk door 412 and directly above the printer 58. The micro floppy disk drive 436 includes a slot 438 for the insertion of a floppy disk into the drive 436. A button 440 is provided to release the floppy disk. In order to protect the micro floppy disk drive 436 from unauthorized access, a drive plate 442 is attached to the upper portion of the printer protective plate 418.

An alternate method of providing large amounts of data in digital form to and from the data base 49 is illustrated in Figs. 3 and 21 where a digital data base 442 in the form of an umbilical data transmission device can be used in place of the floppy disk drive 436. The umbilical data transmission bus 442 is connected to a ground station 444 by means of a cable 446 when the aircraft is in the gate.

The terminal of Fig. 21 as described above provides a particularly efficient and convenient, as well as economical, mechanism for communicating with the airborne cabin management data base 49 of Fig. 5. By combining the various components of the terminal in one housing 400 in the manner shown in Fig. 21, it is possible to construct a terminal that is compact and highly adaptable for use in a passenger aircraft. One of the significant features of the disclosed terminal in Fig. 21 is the front panel 410. This feature permits the terminal to be located in parts of the aircraft where access to the top and sides of the terminal may not be possible. Thus, the terminal is locatable in a maximum number of potential locations within the aircraft. Another very significant feature of the terminal is the provision of the floppy disk drive 436 which permits the loading or unloading of portions of the data base such as the flight history data base 128 as described in detail in Figs. 16A, 16B and 16C.

CLAIMS

1. Apparatus for the in-flight management of aircraft occupant needs, comprising:

an aircraft-carried computer comprising a microprocessor in association with a memory, a video terminal, a printer and a data input device that includes a keyboard; and

an aircraft-carried radio receiver coupled to the microprocessor for updating the memory in response to received radio signals, independently of the data input device.

2. Apparatus according to claim 1, the microprocessor being organized to handle at any time only a restricted amount of data from the memory, the restriction being user-definable by input signals from the data input device to identify any pair of departure and destination airports.

3. Apparatus according to claim 1 or claim 2, wherein the radio receiver is a transceiver whereby data generated on the aircraft via the data input device and the microprocessor may be transmitted to a remote receiving station.

4. Apparatus according to claim 3, wherein the transceiver is organized to transmit and receive digitally coded signals.

5. Apparatus according to any preceding claim, wherein the microprocessor is connected to display selected information on the video screens of a passenger entertainment video system of the aircraft.

6. Apparatus according to any preceding claim, wherein the data input device includes means for reading magnetically recorded data.

7. Apparatus according to claim 6, wherein the means for reading magnetically recorded data is a magnetic card reader.

8. Apparatus according to any preceding claim, wherein the computer further comprises a security lock for preventing operation of the data input device by anyone but selected key personnel.

9. Apparatus according to claim 8, wherein the security lock is means for identifying magnetically recorded data on an operator-identification card before input from the data input device is permitted.

10. Apparatus according to any preceding claim, wherein the memory contains global flight segment data representing information pertinent to each flight segment which the aircraft is likely to fly.

11. Apparatus according to claim 10 wherein the global flight segment data includes departure and arrival airport identifiers for each flight segment stored in the memory.

12. Apparatus according to claim 11 wherein the flight segment data additionally includes flight numbers.

13. Apparatus according to claim 12, wherein the flight segment data additionally includes departure and arrival times for each flight segment stored in the database.

14. Apparatus according to any of claims 10 to 13, wherein the flight segment data includes meal service data.

15. Apparatus according to any of claims 10 to 14, wherein the flight segment data additionally includes passenger service information.

16. Apparatus according to any of claims 10 to 15, wherein the flight segment data includes aircraft type.

17. Apparatus according to any of claims 1 to 9, wherein the memory comprises a general database file having a plurality of flight segment records wherein each of the flight segment records includes at least a portion of the global flight segment data for a particular flight segment.

18. Apparatus according to claim 17 wherein the flight segment records include departure and arrival airport identifiers for the particular flight segment.

19. Apparatus according to claim 18, wherein the flight segment records include the flight number for the particular flight segment.

20. Apparatus according to claim 19, wherein the flight segment records include passenger service information for the particular flight segment.

21. Apparatus according to any of claims 17 to 20, wherein the flight segment records include meal service data for the particular flight segment.

22. Apparatus according to any of claims 17 to 21, wherein the flight segment records include departure and arrival times for the particular flight segment.

23. Apparatus according to any of claims 17 to 22, wherein the microprocessor includes flight segment

record addressing means for addressing and accessing individual desired flight segment records utilizing the departure and arrival airport identifiers that define a flight segment.

24. Apparatus according to claim 23, wherein the flight segment records are stored in addressable locations in the database file, and the segment addressing means includes combining means for combining the departure and arrival identifiers for a desired flight segment record to create a combined expression and means for converting the combined expression into the address of the addressable location in which the desired flight segment record is located.

25. Apparatus according to claim 24, wherein the combining means includes the flight number for the desired flight segment record in the combined expression.

26. Apparatus according to claim 25, wherein the combining means includes the aircraft type for the desired flight segment record in the combined expression.

27. Apparatus according to any of claims 23 to 26, wherein the general database file is stored on a disk file and wherein the address represents the disk file address of the desired flight segment record.

28. Apparatus according to any of claims 1 to 9, wherein the memory contains global flight data representing predetermined information useful in the cabin management functions and flight history data representing operational data associated with one or more flight segments.

29. Apparatus according to claim 28, wherein at least a portion of said global flight data is stored in a general data base file that includes a plurality of flight segment records.

30. Apparatus according to claim 29, wherein each of the flight segment records includes global information with respect to a predetermined flight segment.

31. Apparatus according to claim 29 or claim 30, wherein the data base includes at least one auxiliary data base that includes global information additional to the global information stored in the general data base and wherein the flight segment records include the identification of the location of global information in the auxiliary data bases pertinent to a predetermined flight segment.

32. Apparatus according to claim 31, wherein the location identification includes the address in the

auxiliary data base of the information pertinent to a predetermined flight segment.

33. Apparatus according to any of claims 29 to 32, wherein the flight segment records includes flight segment identifiers that include departure and arrival airport identification codes.

34. Apparatus according to claim 33, wherein the flight segment identifiers additionally include a flight number.

35. Apparatus according to claim 34, wherein the flight segment identifier additionally includes an aircraft type code.

36. Apparatus according to any of claims 29 to 35, wherein the flight segment records include the flight segment arrival and departure times.

37. Apparatus according to claim 36, wherein the flight segment records include the flight time for the flight segment.

38. Apparatus according to claim 36 or claim 37, wherein the flight segment records include a quantity representing the difference between local and GMT time for the departure and arrival times.

* C L M S *

39. Apparatus according to any of claims 29 to 28, wherein the flight segment records include the identification of a service base.

40. Apparatus according to any of claims 29 to 39, wherein the flight segment records include the mileage for the flight segment.

41. Apparatus according to any of claims 29 to 40, wherein the flight segment records include alternate flight numbers for the flight segment.

42. Apparatus according to any of claims 29 to 41, wherein the flight segment records include identification of equipment required on the flight segment.

43. Apparatus according to any of claims 29 to 42, wherein the flight segment records include passenger service information.

44. Apparatus according to claim 43, wherein the passenger services information includes meal information movie information and amenity information.

45. Apparatus according to any of claims 29 to 44, wherein the flight segment records include messages.

46. Apparatus according to claim 45, wherein the messages include special messages for a predetermined flight for a predetermined date.

47. Apparatus according to any of claims 29 to 46, wherein the flight segment records include currency information.

48. Apparatus according to any of claims 29 to 47, wherein the flight segment records contain inflight sales information.

49. Apparatus according to claim 43, wherein additional passenger service information is stored in at least one auxiliary data base file and at least a portion of the passenger service information in the flight segment records in the general data base file is in the form of a key to a predetermined record in one of the auxiliary data base files.

50. Apparatus according to claim 45, wherein additional message information is stored in at least one auxiliary data base file and at least a portion of each message in the flight segment records in the general data base file is in the form of a key to a predetermined record in one of the auxiliary data base files.

51. Apparatus according to claim 47, wherein additional currency information including exchange ratios is stored in an auxiliary data base file, and at least a portion of the currency information in the flight segment records in the general data base file is a key to a predetermined record in the auxiliary data base file.

52. Apparatus according to any of claims 28 to 51, wherein at least a portion of the flight history data is stored in a history file.

53. Apparatus according to claim 52, wherein the history file includes departure inventory data for each flight segment.

54. Apparatus according to claim 53, wherein the history file includes arrival inventory for each flight segment.

55. Apparatus according to claim 54, wherein the history file includes inventory usage data for each flight segment.

56. Apparatus according to claim 54 or claim 55, wherein the history file includes the amount of currency received during each flight segment.

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57. Apparatus according to claim 56, wherein the history file includes the U.S. dollar equivalent amount of each non-U.S. dollar currency received during each flight segment.

58. Apparatus according to any of claims 52 to 57 wherein the flight history file includes flight attendant information for each flight segment.

59. Apparatus according to claim 58, wherein the flight attendant information includes the employee number for the flight attendant entering information into the flight history file during a flight segment.

60. Apparatus according to any of claims 52 to 59, wherein the flight history file includes at least one record for a flight segment.

61. Apparatus according to claim 60, wherein the record includes a flight segment identifier.

62. Apparatus according to claim 60 or claim 61, wherein the record includes the time the record was offloaded from the aircraft.

63. Apparatus according to any of claims 28 to 62, wherein the microprocessor includes menu generating means

for generating a menu display on the video terminal and for permitting operator selection, by means of the data input device, of one or more of a plurality of cabin management operations.

64. Apparatus according to claim 63, wherein one of the cabin management operations is a sign-on operation requesting the operator to enter information with respect to a flight segment.

65. Apparatus according to claim 64, wherein the sign-on operation includes a request for the operator to enter flight attendant information.

66. Apparatus according to any of claims 63 to 65, wherein one of the cabin management operations is a preflight briefing operation.

67. Apparatus according to claim 66, wherein the preflight briefing operation includes generating a display on the video terminal of flight segment information.

68. Apparatus according to any of claims 63 to 67, wherein one of the cabin management operations is a departure inventory entry operation.

69. Apparatus according to claim 68, wherein one of the cabin management operations is an arrival inventory entry

operation.

70. Apparatus according to claim 69, wherein the departure inventory operation inlcudes the generation on the video terminal of at least one inventory input display to permit operator input of various cabin inventory items by means of the data input device into the data base as flight history data.

71. Apparatus according to claim 70, wherein there are at least two of the inventory input displays, of which a first is a first class inventory input display and a second is an economy class inventory input display.

72. Apparatus according to any of claims 63 to 71, wherein one of the cabin management operations is a currency conversion operation.

73. Apparatus according to any of claims 63 to 72, wherein one of the cabin management functions is a discrepancy operation wherein a list of cabin equipment discrepancies stored in the data base may be displayed on the video terminal.

74. Apparatus according to claim 73, wherein the discrepancy operation includes means for operator input of equipment discrepancies information by means of the

data input device into the data base.

75. Apparatus according to any of claims 63 to 74, wherein one of the cabin management operations is an end of flight operation which prevents the flight history data for a flight segment from being further altered by an operator using the data input device.

76. Apparatus according to claim 64 or claim 65, wherein the sign-on operation must be performed before any other of the cabin management operations can be selected by means of the data input device.

77. Apparatus for the in-flight management of aircraft occupant needs, substantially as described herein with reference to Figures 1 to 4 of the drawings.

78. Apparatus according to claim 77 wherein the memory is organized substantially as described herein with reference to Figures 5 to 20 of the drawings.