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Technology

A SYSTEM AND METHOD FOR MANAGING AIRCRAFTS IN AIRSPACES USING AN AIRSPACE MANAGEMENT SYSTEM

KEY WORDS: ATC, ETA, ETD, Safety management system (SMS), Situation display, FDPS, TCAS, Transition altitude, Transition layer, Transition level

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ABSTRACT

While writing the traffic electronically on this prototype at the same time it not only double checks all the parameters a controller writes that too simultaneously correct for level corrections or route clearances errors if any and which is the best part of the invention as its give's enhancement to safety. So, this prototype solves the above problem with instant corrections and gives a controller more confident in transmitting these few parameters, levels to the pilots in more professional ways as we know Human errors causes eighty percent of accidents in aviation. It also advances safety as it writes continuous heading and change of route permission like direct to a reporting point or giving left of track permission or right of track permission to a pilot due bad weather, so as he sees in radar, he can cross check which not happens on paper traffic sheets and which is the most important part of this invention. This makes the product unique and different as it is erasing human errors to least as we know the air traffic controller can distracted by various things in a very busy environment.

INTRODUCTION

Air traffic controllers have been controlling the traffic on radar manually since last 70 years using slides and traffic sheets. Many a times a controller in a busy environment with so much input either wrongly feed the data in system or after listening to a assistant copy wrongly on his or her sheets which he comes to know sometime before corrected by his own intuition or by assistant intuition of realizing something is wrongly fed in the system or in sheet or in both or finally alerted by the one of the pilots which not only a embarrassing solution but also highly dangerous for the aviation safety. Even sometime corrected by the neighbouring ATC units. While writing the traffic electronically on this prototype at the same time it not only double checks all the parameters a controller writes that too simultaneously correct for level corrections or route clearances errors if any and which is the best part of the invention as its give's enhancement to safety. So, this invention solves the above problem with instant corrections and gives a controller more confident in transmitting these few parameters, levels to the pilots in more professional ways as we know Human errors causes 80 percent of accidents in aviation. It also advances safety as it writes continuous heading and change of route permission like direct to a reporting point or giving left of track permission or right of track permission to a pilot due bad weather, so as he sees in radar, he can cross check which not happens on paper traffic sheets and which is the most important part of this invention. This makes the product unique and different as it is erasing human errors to least as we know the air traffic controller can distracted by various things in a very busy environment.

With time, increase in the amount of air travellers has extended the number of flights and the airspace is getting more and more busier than ever. And hence assigning the flights precise positions has become more difficult. And more than that, managing these flights has become a tedious task. This can be a potential cause for air accidents and respective casualties in the near future. Hence with this invention we introduce an intellectual system in between the Air Traffic Control and the air traffic assistants or FDPS (flight data processing system) which will keep a log of all the positions assigned to the flights and highlight any contradictory position before it's assignment and hence ensure a precise positioning of flights in the respective airspace. This invention can be a physical product, in which the controller is supposed to input position values such as call sign, departure-Squak, flight levels, routes, headings, route change instructions like direct to reporting point or left of track by Nautical miles, ETA, ETD. And the device is supposed to keep a log of these values. Whenever the controller adds a contradictory value to the preceding values, the mistaken value will be highlighted so that the controller could change it before it's actual assignment.

Along with this we further plan to make this invention smart enough to suggest new values by itself relieving the controller in times of heavy traffic. This invention will also help in avoiding the use of paper sheets, slides and hence avoiding a stockpile of paper and plastic as the invention will store all the values assigned on a digital encrypted database, from where they can be accessed anytime in the future for reference.

An Overview of this Prototype:

Embodiments of the present invention relate to an aircraft management,more particularly relate to a system and method for managing aircrafts in airspacesusing an airspace managementsystem.Generally, an Air Traffic Control Center includes a control tower where anair traffic controller (ATC) is employed to control aircrafts that are coming from one location and going to another location. A pilot in the aircraft is in touch with the ATCof a particular airspace to obtain coordinates when the pilot is passing through the airspace. This happens at frequent time intervals when the aircraft reaches certainpoints in the airspace known as reporting points. The ATC allocates coordinates and other parametric values to the aircraft and indicates any significant changes in theprevious ones which were allocated to the airspace by another ATC, whose airspacethe aircraft had crossed previously. Hence, the goal of the air traffic control center isto properly control the aircraft to its destination and the ATCs ensures to manage the aircraft by coordinating with the pilot when the aircraft is in their respective airspace.However, each of the aircrafts needs to obtain unique coordinates andparametric values to prevent collisions with each other when there are hundreds and thousands of aircrafts travelling in the entire airspace at a time. This again has to beensured by the ATC. While doing this, the ATC may do committing mistakes andsometimes end up assigning conflicting values, which leads to a problem that causesa threat to human life. A traffic collision avoidance system (TCAS) can be a solutionfor preventing collisions between the aircrafts. Though, the TCAS is installed on the aircrafts to prevent collisions between the aircrafts, the TCAS s too slow to detect anerror and cannot detect the error until the aircrafts are too close.Nowadays, increase in an amount of air travelers has extended severalaircrafts so that the airspace is getting more and more busy than ever. This would be much difficult for the ATC for assigning precise positions to the aircrafts. More thanthat, managing these aircrafts in the airspaces has become a tedious task for the ATC, which is a potential cause for air accidents and respective causalities in near future.

Traditionally, the ATCs have been controlling the traffic on

radar manuallysince last 70 years using slides and traffic sheets. Many times, in a busy environmentwith so much input, the ATC might do committing mistakes by wrongly providing data himself in a system or wrongly providing data in his/her sheets upon receivinghis/her assistant copy, which he/she analyses sometime before corrected by his/herown intuition or by his/her assistant intuition of realizing something is wrongly fed inthe system, in his/her sheet, in both. Further, an alert on the correction of errors fromone of the pilots is not only an embarrassing solution but also highly dangerous for the aviation safety. Sometimes, the data wrongly given by the ATC is corrected byneighboring ATC Units.

Hence, there is a need for an improved system and method for managingaircrafts in airspaces using an airspace management system.

Summary

In accordance with one embodiment of the disclosure, a method formanaging a plurality of aircrafts in an airspaceusing an airspace management system is disclosed. The method includes the following steps of: (a) obtaining, using a user input subsystem communicatively coupled to a processor, a first input from historicalvalues including coordinate values and parametric values provided by a user to control the plurality of aircrafts to a destination; (b) automatically self-learning, using a self-learning subsystem communicatively coupled to the processor, a plurality of positions corresponding to the plurality of aircrafts based on the coordinate and parametric values; (c) obtaining, using the user input subsystem communicatively coupled to the processor, a second input associated with position values provided to the plurality of aircrafts from the user; (d) validating the second input associated with the position values by comparing, using a position values comparison subsystem communicatively coupled to the processor, the second input associated with the position values with the coordinate and parametric values based self-learnt positions; (e) upon comparing, detecting, using an error detection subsystem communicatively coupled to the processor, an error in the position values provided to the plurality of aircrafts when the user adds contradictory position values to the coordinate and parametric values; and (f) outputting, using an output subsystem communicatively coupled to the processor, an indication of the error detected in the position values to the user.

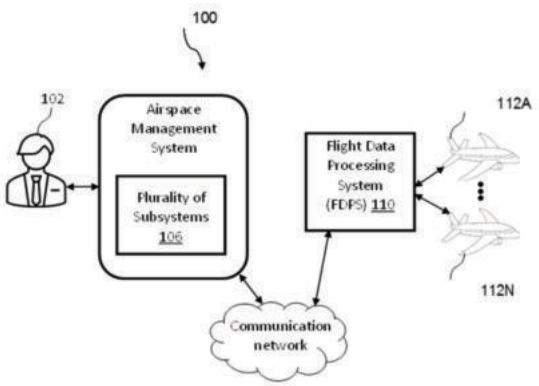

FIG. 1

FIG. 1 is a block diagram of a system for managing a plurality of aircrafts in an airspace using an airspace management system, in accordance with an embodiment of the present disclosure;

In an embodiment, the method further includes upon detecting the error in the position values, enabling, using the error detection subsystem, the user to update the position values in accordance with the coordinate and parametric values before assigning the position values to the plurality of aircrafts for providing precise positioning of the plurality of aircrafts in a respective airspace.

In another embodiment, the method further includes determining, using aposition suggestion subsystem communicatively coupled to the processor, whether an aircraft traffic in the airspace is heavier than a predetermined threshold; retrieving,using the position suggestion subsystem, the plurality of self-learnt positions corresponding to the plurality of aircrafts when the aircraft traffic in the airspace is heavier than the predetermined threshold; and automatically suggesting, using the position suggestion subsystem, the plurality of self-learnt positions directly to theplurality of aircrafts.

In one aspect, a system for managing a plurality of aircrafts in an airspace using an airspace management system is provided. The system includes a hardware processor and a memory. The memory is coupled to the hardware processor and the memory includes a set of program instructions in the form of a plurality of subsystems configured to be executed by the hardware processor. The plurality of subsystems includes a user input subsystem, a self-learning subsystem, a position valuescomparison subsystem, an error detection subsystem, and an output subsystem.

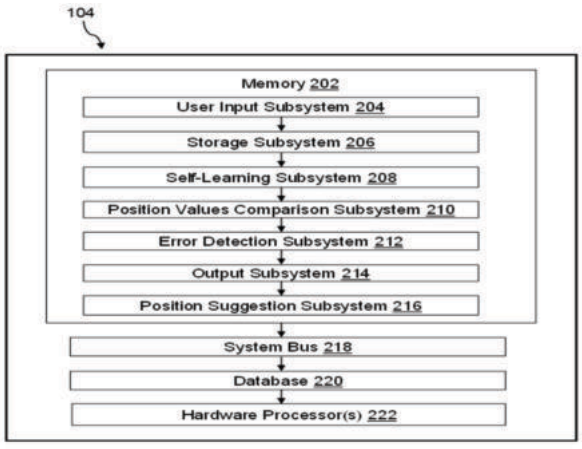

FIG. 2

FIG. 2 is a block diagram illustrating an exemplary airspacemanagement system, such as those shown in **FIG. 1**, in accordance with an embodiment of the present disclosure;

The user input subsystem obtains a first input from historical values comprising coordinate values and parametric values provided by a user to control the plurality of aircrafts to a destination. The self-learning subsystem automatically self learns a plurality of positions corresponding to the plurality of aircrafts based on the coordinate and parametric values. The user input subsystem obtains a second inputassociated with position values provided to the plurality of aircrafts from the user. The position values comparison subsystem validates the second input associated with the position values by comparing the second input associated with the position values with the coordinate and parametric values based self-learnt positions. The error detection subsystem, upon comparing, detects an error in the position values provided to the plurality of aircrafts when the user adds contradictory positions values to the coordinate and parametric values. The output subsystem outputs an indication of the error detected in the position values to the user.

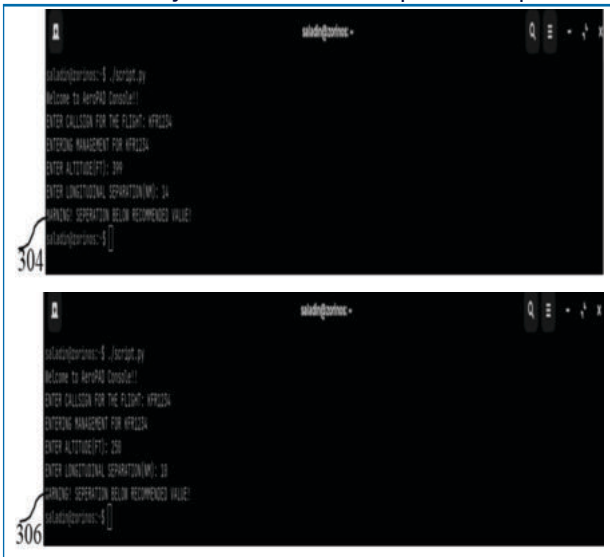

FIG. 3

FIG. 3 Illustrates screenshots of errors detected in the position values displayed to the user through a display screen, in accordance with an embodiment of the present disclosure;

In an embodiment, the plurality of subsystems further includes a a position suggestion subsystem that (a) determines whether an aircraft traffic in the airspace is heavier than a predetermined threshold, (b) retrieves the plurality of self-learnt positions corresponding to the plurality of aircrafts when the aircraft traffic in the airspace is heavier than the predetermined threshold, and (c) automatically suggests the plurality of self-learnt positions directly to the plurality of aircrafts.

To further clarify the advantages and features of the present disclosure, a more particular description of the disclosure will follow by reference to specific embodiments thereof, which are illustrated in the appended figures. It is to be appreciated that these figures depict only typical embodiments of the disclosure and are therefore not to be considered limiting in scope.

CONCLUSION

Air traffic controllers have been controlling the traffic on radar manually since last 70 years using slides and traffic sheets. Many a times a controller in a busy environment with so much input either wrongly feed the data in system or after listening to an assistant copy wrongly on his or her sheets which he comes to know sometime before corrected by his own intuition or by assistant intuition of realizing something is wrongly fed in the system or in sheet or in both or finally alerted by the one of the pilots which not only a embarrassing solution but also highly dangerous for the aviation safety. Even sometime corrected by the neighbouring ATC units. While writing the traffic electronically on this prototype at the same time it not only doubles check all the parameters a controller writes that too simultaneously correct for level corrections or route clearances errors if any and which is the best part of the invention as its give's enhancement to safety. So, this invention solves the above problem with instant corrections and gives a controller more confident in transmitting these few parameters, levels to the pilots in more professional ways as we know Human errors causes 80 percent of accidents in aviation. It also advances safety as it writes continuous heading and change of route permission like direct to a reporting point or giving left of track permission or right of track permission to a pilot due bad weather, so as he sees in radar, he can cross check which not happens on paper traffic sheets and which is the most important part of this invention. This makes the product unique and different as it is erasing human errors to least as we know the air traffic controller can distracted by various things in a very busy environment.

Abbreviation

ATC. Air Traffic Control
ETA. Estimated Time of Arrival
ETD. Estimated Time of Departure
Safety management system (SMS). A systematic approach to managing safety, including the necessary organizational structures, accountability, responsibilities, policies, and procedures.
Situation display. An electronic display depicting the position and movement of aircraft and other information as required.
FDPS. Flight Data Processing System
TCAS. Traffic Collision Avoidance System
Transition altitude. The altitude at or below which the vertical position of an aircraft is controlled by reference to altitudes.
Transition layer. The airspace between the transition altitude and the transition level.
Transition level. The lowest flight level available for use above the transition altitude.

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