CLAIMS

We claim:

1. A simulation device of flight management system (FMS), comprising:

a navigable database and a performance database;

a horizontal section portion;

a vertical section portion, and

a display portion comprising an interface of control display unit (CDU), mutually integrated with the horizontal section portion and vertical section portion, wherein

the horizontal section portion is configured to determine horizontal route information designated by a user through the navigable database and the performance database, and

the vertical section portion is configured to determine vertical route information of the route designated by a user through the navigable database and the performance database, wherein

the vertical section portion is further configured to determine the vertical route information by:

calculating a predicted speed and a predicted altitude for each waypoint of a flight according to limits for speed and altitude of each waypoint, and

obtaining at least a distance between two waypoints of the flight by determining the vertical route information of a plurality of points in the flight based on the predicated speed and the predicated altitude for each waypoint, the plurality of points comprising the waypoints,

wherein the horizontal section portion is further configured to update the horizontal route information according to the obtained distance; and

the updated horizontal route information and the determined vertical route information are displayed on the interface of CDU.

2. The simulation device of FMS according to claim 1, wherein the display portion comprises:

one or more display pages;

a page database comprising one or more data items with each display page number having a corresponding data item, and

a transferring instrument for transferring one or more data items in the page database to the one or more corresponding display pages.

3. The simulation device of FMS according to claim 2, each page comprises a plurality of variable areas for displaying contents, and the corresponding data items in the page database comprise a plurality of contents, wherein at least one variable area can be updated according to the contents of the corresponding data item in the page database.

4. The simulation device of FMS according to claim 3, the transferring instrument comprises at least one sub-transferring instrument which performs real-time computing and updates at least one variable area.

5. The simulation device of FMS according to claim 1, the horizontal section portion comprises a leglistVertical for computing a vertical section, wherein each route comprises horizontal waypoint information of one or more waypoints.

6. The simulation device of FMS according to claim 5, the horizontal section portion further comprises a leglistTemp for storing modifications, a leglistFinal for storing executed routes and a leglistFull for storing waypoints throughout the flight.

7. The simulation device of FMS according to claim 1, the vertical section portion comprises take-off sub-portion, climbing sub-portion, cruising sub-portion, declining sub-portion, landing sub-portion and going around sub-portion, wherein each sub-portion comprises one or more predetermined points and the vertical section portion computes vertical section information of each the predetermined point.

8. The simulation device of FMS according to claim 7, one predetermined point is set by every other one second for the take-off and approaching portions.

9. The simulation device of FMS according to claim 7, the vertical section portion computes the vertical section information of the predetermined points, by iteration, of take-off sub-portion, climbing sub-portion, cruising sub-portion, declining sub-portion, landing sub-portion and going around sub-portion.

10. The simulation device of FMS according to claim 9, the vertical section portion simplifies, by table looking up, the iteration calculation of predetermined points of climbing sub-portion, cruising sub-portion, and declining sub-portion.

11. The simulation device of FMS according to claim 7, the vertical section portion computes, by interpolation, the vertical section information of predetermined points of take-off and approaching sub-portions.

12. The simulation device of FMS according to claim 11, the vertical section portion comprises an arrival-departure database.

13. The simulation device of FMS according to claim 12, the arrival-departure database comprises a plurality of data tables classified by arrival-departure conditions.

14. The simulation device of FMS according to claim 13, the arrival-departure database comprises a plurality of sub-data tables classified by initial performance parameters of an airplane.

15. The simulation device of FMS according to claim 14, the sub-data tables comprise a plurality of vertical section data with each vertical section data corresponding to the specific values of initial performance parameters of one or more airplanes.

16. The simulation device of FMS according to claim 15, the specific values of initial performance parameters of one or more airplanes comprise a maximum value and a minimum value.

17. The simulation device of FMS according to claim 1, wherein the vertical section portion upgrades horizontal route information of the horizontal section portion according to vertical route information.

18. The simulation device of FMS according to claim 1, wherein the vertical section portion uses the vertical sections that have at least partially been computed when waypoints change.

19. A training aid comprising the simulation device of FMS according to claim 1.