SYSTEMS AND METHODS FOR DISPLAYING IN-FLIGHT NAVIGATION PROCEDURES

BACKGROUND

The field of the disclosure relates generally to in-flight navigation procedures, and more specifically, to methods and system for use in displaying these procedures in a graphical form.

In-flight navigation procedures are typically depicted on a cockpit display or paper charts to a pilot and/or co-pilot as pre-composed and non-interactive images. Such images typically contain relatively large quantities of information which may be applicable to multiple procedures and multiple flight paths.

The pilot, co-pilot, and/or other personnel may be required to visually and mentally digest and filter non-relevant information from the displayed procedures to focus on information that applies specifically to the operational situation at hand. For example, if the aircraft being flown is a category "C" aircraft, then information pertaining to the category "A", "B" and "D" aircraft is not needed by the pilot or co-pilot. As will be appreciated, this can significantly add to the cognitive workload of the pilot and/or co-pilot during normal flight operations and/or when performing a flight maneuver, such as a landing approach, in the aircraft.

Even within digital Electronic Flight Bag (EFB) devices, at least some known chart displays do not allow real-time user interaction to filter information, to alter displayed data, or to use real-time and current operational parameters to declutter displayed procedures automatically and dynamically. Thus, such charts still require users to cognitively filter out a relatively large amount of information that is not pertinent to the instant situation.

BRIEF DESCRIPTION

In one ~~aspect~~example, a computing device for displaying procedures for an aircraft is provided. The computing device includes a presentation interface, a user input interface, and a processing device coupled to the presentation interface and to the user input interface. The processing device is configured to cause the presentation interface to display an initial procedure display that includes information for a plurality of procedures that include at least one of an initial approach procedure, an intermediate approach procedure, a final approach procedure, and a missed approach procedure, and in response to a triggering event, cause the

presentation interface to display an adjusted procedure display that emphasizes a predetermined portion of ~~a~~ one procedure of the plurality of procedures by excluding information included in the initial procedure display for other procedures of the plurality of procedures and by automatically adjusting a scale of an overhead view relative to the initial procedure display by resizing and centering the predetermined portion, wherein the adjusted procedure display is distinct from an aircraft navigational display, and wherein the procedure is part of one of a standard instrument departure and a standard terminal arrival route.

In another ~~aspect~~example, a processing device for displaying procedures for an aircraft is provided. The processing device is configured to display an initial procedure display on a presentation interface, the initial procedure display including information for a plurality of procedures that include at least one of an initial approach procedure, an intermediate approach procedure, a final approach procedure, and a missed approach procedure, detect a triggering event, and in response to the detected triggering event, display an adjusted procedure display that emphasizes a predetermined portion of ~~a~~ one procedure of the plurality of procedures on the presentation interface by excluding information included in the initial procedure display for other procedures of the plurality of procedures and by automatically adjusting a scale of an overhead view relative to the initial procedure display by resizing and centering the predetermined portion, wherein the adjusted procedure display is distinct from an aircraft navigational display, and wherein the procedure is part of one of a standard instrument departure and a standard terminal arrival route.

In yet another ~~aspect~~example, a method for displaying procedures for an aircraft is provided. The method includes displaying, on a presentation interface, an initial procedure display that includes information for a plurality of procedures that include at least one of an initial approach procedure, an intermediate approach procedure, a final approach procedure, and a missed approach procedure, detecting, at a processing device coupled to the presentation interface, a triggering event, and displaying, in response to the detected triggering event, an adjusted procedure display on the presentation interface, wherein the adjusted procedure display emphasizes a predetermined portion of ~~a~~ one procedure of the plurality of procedures by excluding information included in the initial procedure display for other procedures of the plurality of procedures and by automatically adjusting a scale of an overhead view relative to the initial procedure display by resizing and centering the predetermined portion, wherein the adjusted procedure display is distinct from an aircraft navigational display, and wherein the procedure is part of one of a standard instrument departure and a standard terminal arrival route.

The features, functions, and advantages that have been discussed can be achieved independently in various implementations or may be combined in yet other implementations, further details of which can be seen with reference to the following description and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram of an exemplary computing device.

Fig. 2 is an initial procedure display that may be displayed using the computing device shown in Fig. 1.

Fig. 3 is an adjusted procedure display that may be displayed using the computing device shown in Fig. 1.

Fig. 4 is a flowchart of an exemplary method for displaying aircraft procedures.

Fig. 5 is an exemplary process flow diagram that may be implemented using the computing device shown in Fig. 1.

DETAILED DESCRIPTION

The systems and methods described herein enable displaying an initial procedure display and an adjusted procedure display. The adjusted procedure display emphasizes a predetermined portion of a procedure, and is displayed in response to a

~~WHAT IS CLAIMED IS:~~CLAIMS

1. A computing device for displaying procedures for an aircraft, said computing device comprising:

a presentation interface;

a user input interface; and

a processing device coupled to said presentation interface and to said user input interface, said processing device configured to:

cause said presentation interface to display an initial procedure display that includes information for a plurality of procedures that include at least one of an initial approach procedure, an intermediate approach procedure, a final approach procedure, and a missed approach procedure; and

in response to a triggering event, cause said presentation interface to display an adjusted procedure display that emphasizes a predetermined portion of ~~a~~ one procedure of the plurality of procedures by excluding information included in the initial procedure display for other procedures of the plurality of procedures and by automatically adjusting a scale of an overhead view relative to the initial procedure display by resizing and centering the predetermined portion, wherein the adjusted procedure display is distinct from an aircraft navigational display, and wherein the procedure is part of one of a standard instrument departure and a standard terminal arrival route.

2. A computing device in accordance with Claim 1, wherein the triggering event is initiated based on at least one of a position, trajectory, or attitude of the aircraft.

3. A computing device in accordance with Claim 2, further comprising a communication interface coupled to said processing device and configured to communicate with a position sensor to determine the position of the aircraft.

4. A computing device in accordance with Claim 1, wherein the triggering event is initiated in response to an input received at said user input interface.

5. A computing device in accordance with Claim 1, wherein said processing device is further configured to modify, in response to an input received at said user input interface, at least one display parameter of the initial procedure display and the adjusted procedure display.

6. A computing device in accordance with Claim 1, wherein the adjusted procedure display emphasizes the predetermined portion of the procedure by including a profile view of the predetermined portion of the procedure.

~~7. A computing device in accordance with Claim 1, wherein the adjusted procedure display emphasizes the predetermined portion of the procedure by adjusting a scale of an overhead view relative to the initial procedure display.~~

~~8. A computing device in accordance with Claim 1, wherein the adjusted procedure display emphasizes the predetermined portion of the procedure by excluding information included in the initial procedure display that is extraneous to the predetermined portion of the procedure~~.

~~9~~7. A computing device in accordance with Claim 1, wherein the adjusted procedure display emphasizes the predetermined portion of the procedure by modifying information displayed on a briefing strip relative to the initial procedure display.

~~10~~8. A ~~computing~~ processing device for displaying procedures for an aircraft, said ~~computing~~ processing device configured to:

display an initial procedure display on a presentation interface, the initial procedure display including information for a plurality of procedures that include at least one of an initial approach procedure, an intermediate approach procedure, a final approach procedure, and a missed approach procedure;

detect a triggering event; and

in response to the detected triggering event, display an adjusted procedure display that emphasizes a predetermined portion of ~~a~~ one procedure of the plurality of procedures on the presentation interface by excluding information included in the initial procedure display for other procedures of the plurality of procedures and by automatically adjusting a scale of an overhead view relative to the initial procedure display by resizing and centering the predetermined portion, wherein the adjusted procedure display is distinct from an aircraft navigational display, and wherein the

procedure is part of one of a standard instrument departure and a standard terminal arrival route.

~~119~~. A ~~computing~~ processing device in accordance with Claim ~~108~~, wherein said ~~computing~~ processing device is configured to detect the triggering event based on at least one of a position, trajectory, or attitude of the aircraft.

~~12~~10. A ~~computing~~ processing device in accordance with Claim ~~11~~9, wherein said ~~computing~~ processing device is configured to detect the triggering event by communicating with a position sensor that determines the position of the aircraft.

~~13~~11. A ~~computing~~ processing device in accordance with Claim ~~10~~8, wherein said ~~computing~~ processing device is configured to detect the triggering event in response to an input received at a user input interface coupled to said ~~computing~~ processing device.

~~14. A computing device in accordance with Claim 10, wherein the adjusted procedure display emphasizes the predetermined portion of the procedure by adjusting a scale of an overhead view relative to the initial procedure display.~~

~~15. A computing device in accordance with Claim 10, wherein the adjusted procedure display emphasizes the predetermined portion of the procedure by excluding information included in the initial procedure display that is extraneous to the predetermined portion of the procedure.~~

~~16~~12. A method for displaying procedures for an aircraft, said method comprising:

displaying, on a presentation interface, an initial procedure display that includes information for a plurality of procedures that include at least one of an initial approach procedure, an intermediate approach procedure, a final approach procedure, and a missed approach procedure;

detecting, at a processing device coupled to the presentation interface, a triggering event; and

displaying, in response to the detected triggering event, an adjusted procedure display on the presentation interface, wherein the adjusted procedure display emphasizes a predetermined portion of ~~a~~ one procedure of the plurality of procedures by excluding information included in the initial procedure display for other procedures of the plurality of procedures and by automatically adjusting a scale of an overhead view

relative to the initial procedure display by resizing and centering the predetermined portion, wherein the adjusted procedure display is distinct from an aircraft navigational display, and wherein the procedure is part of one of a standard instrument departure and a standard terminal arrival route.

~~17~~13. A method in accordance with Claim ~~16~~12, wherein displaying an adjusted procedure display comprises displaying an adjusted procedure display that includes a profile view of the predetermined portion of the procedure.

~~18. A method in accordance with Claim 16, wherein displaying an adjusted procedure display comprises displaying an adjusted procedure display that has an adjusted scale of an overhead view relative to the initial procedure display.~~

~~19. A method in accordance with Claim 16, wherein displaying an adjusted procedure display comprises displaying an adjusted procedure display that excludes information included in the initial procedure display that is extraneous to the predetermined portion of the procedure.~~

~~20~~14. A method in accordance with Claim ~~16~~12, wherein displaying an adjusted procedure display comprises displaying an adjusted procedure display that modifies information displayed on a briefing strip relative to the initial procedure display.