

[0026] In some embodiments, the request is formulated within a checklist generated as a result of the non-normal event.

[0027] In accordance with another broad aspect, there is provided a graphical user interface (GUI) of an aircraft. The GUI comprises a graphical display of at least one aircraft or system parameter, and a graphical indicator of at least one performance limitation co-located with a display of the at least one aircraft or system parameter, the at least one performance limitation resulting from a reconfiguration of the aircraft upon detection of a non-normal event in-flight.

[0028] In some embodiments, the graphical indicator corresponds to a prescription of a checklist generated as a result of the non-normal event.

[0029] In some embodiments, the graphical indicator is overlaid with the graphical display of the at least one aircraft or system parameter.

[0030] In some embodiments, the graphical indicator comprises a symbol associated with at least one of the at least one performance limitation and the at least one aircraft or system parameter.

[0031] In some embodiments, the graphical indicator comprises an available range of the at least one aircraft or system parameter in relation to a current value of the at least one aircraft or system parameter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0032] Further features and advantages of the present invention will become apparent from the following detailed description, taken in combination with the appended drawings, in which:

[0033] FIG. 1 is a schematic illustration of an aircraft and a flight deck, in accordance with one embodiment;

[0034] FIG. 2 is a block diagram of the aircraft, in accordance with one embodiment;

[0035] FIG. 3 is a block diagram of a performance limitation system, in accordance with one embodiment;

[0036] FIG. 4 is flowchart of a method performed by the performance limitation system, in accordance with one embodiment;

[0037] FIG. 5 is an example of a primary flight display with overlaid indicators of performance limitation; and

[0038] FIG. 6 is an example of a cockpit gauge with an overlaid indicator of performance limitation.

[0039] It will be noted that throughout the appended drawings, like features are identified by like reference numerals.

DETAILED DESCRIPTION

[0040] The present disclosure describes systems and methods associated with providing pilot support in response to non-normal events in-flight. It should be understood that the expression “non-normal event” is used herein to refer to events that may be classified as “abnormal”, “non-normal”, and/or “emergencies”. Even though various aspects of the present disclosure are described in the context of aircraft, it is understood that aspects disclosed herein are equally applicable to systems and methods for other vehicles, such as trains, ships and buses for example. In various embodiments, the systems and methods disclosed herein may be considered to embed on a flight deck graphical presentations indicative of performance limitations of the aircraft resulting from an aircraft reconfiguration, in order to complement

traditional instruments and displays currently available. The graphical presentations are co-located on the flight deck with the primary graphical presentations of the parameters to which the performance limitations apply.

[0041] In various embodiments, the systems and methods disclosed herein may in some situations reduce or eliminate the need for a flight crew to consult one or more source(s) of information, such as a checklist, separate from a primary display of an aircraft. In addition, the systems and methods disclosed herein may reduce or eliminate the need for a flight crew to rely on memory to respect performance limitation parameters of an aircraft resulting from an in-flight reconfiguration of the aircraft. In particular, when a reconfiguration of an aircraft occurs as a result of a non-normal event, the systems and methods disclosed herein will cause indicators representative of performance limitations of the aircraft to be displayed co-located with aircraft or system parameters to which they relate. In some embodiments, the indicators representative of performance limitations may overlay the graphical presentations of the aircraft or system parameters to which the performance limitations apply. Accordingly, in some embodiments, the systems and methods disclosed herein may contribute toward enhancing awareness of the flight crew and reducing the flight crew's workload. Aspects of various embodiments are described through reference to the drawings.

[0042] FIG. 1 shows an exemplary partial schematic representation of a flight deck 12 which may be part of an aircraft 10. Aircraft 10 may be a corporate, private, commercial or any other type of aircraft. For example, aircraft 10 may be a fixed-wing aircraft. In some embodiments, aircraft 10 may be a narrow-body, twin engine jet airliner. Flight deck 12 may comprise additional or fewer elements than those shown and described herein. Flight deck 12 may comprise left portion 12A intended to be used by a pilot (sometimes referred as “captain”) of aircraft 10 and right portion 12B intended to be used by a co-pilot (sometimes referred as “first officer”) of aircraft 10. Left portion 12A and right portion 12B may comprise functionally identical components so that at least some operational redundancy may be provided between left portion 12A and right portion 12B of flight deck 12. As used herein, the term “flight crew” is intended to encompass one or more individuals responsible for operation of aircraft 10 during flight. Such individuals may, for example, include the pilot and/or the co-pilot. Similarly, the term “crew” is intended to encompass one or more individuals responsible for operation of a vehicle comprising a system as disclosed herein.

[0043] Flight deck 12 may comprise one or more display devices 14 providing respective display areas 16. In the exemplary configuration of flight deck 12 shown in FIG. 1, left portion 12A and right portion 12B may each comprise two display devices 14 and an additional display device 14 may be provided in pedestal region 18 of flight deck 12. Display device 14 provided in pedestal region 18 may be shared between the pilot and the co-pilot during normal operation of aircraft 10. Additional display devices 14 may be positioned in a location above a windshield in a heads-up position. Display devices 14 may include one or more cathode-ray tubes (CRTs), liquid crystal displays (LCDs), plasma displays, light-emitting diode (LED) based displays or any known or other type of display device that may be suitable for use in flight deck 12. Display devices 14 may be configured to dynamically display operational and status