SYSTEMS AND METHODS FOR FLIGHT CONTROL OF EVTOL AIRCRAFT

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Application No. 18/468,421, titled "SYSTEMS AND METHODS FOR FLIGHT CONTROL OF EVTOL AIRCRAFT," filed September 15, 2023 (Attorney Docket No. 16499.0011-00000), which in turn priority to U.S. Provisional Application No. 63/504,958, titled "SYSTEMS AND METHODS FOR FLIGHT CONTROL OF EVTOL AIRCRAFT," filed May 30, 2023 (Attorney Docket No. 16499.6005-00000), the disclosures of which are incorporated by reference in their entirety for all purposes.

TECHNICAL FIELD

[0002] This disclosure relates generally to powered aerial vehicles. More particularly, and without limitation, the present disclosure relates to innovations in aircrafts driven by electric propulsion systems. Certain aspects of the present disclosure generally relate to systems and methods for flight control of aircrafts driven by electric propulsion systems and in other types of vehicles, as well as flight control of aircrafts in flight simulators and video games. Other aspects of the present disclosure generally relate to improvements in flight control systems and methods that provide particular advantages in aerial vehicles and may be used in other types of vehicles.

SUMMARY

[0003] Aspects of this present disclosure relate to flight control of electric aircrafts and other vehicles.

[0003a] In an aspect, the present disclosure refers to an aircraft comprising: a fuselage; one or more flight control computers configured to provide control signals; a first set of electrically

powered propellers and a second set of electrically powered propellers disposed on one side of the fuselage, wherein the first set is disposed forward of the second set; a third set of electrically powered propellers and a fourth set of electrically powered propellers disposed on another side of the fuselage, wherein the third set is disposed forward of the fourth set; and a plurality of electrical buses coupled to the one or more flight control computers; wherein the one or more flight control computers are configured to provide control signals via one electrical bus of the plurality of electrical buses to at least one of the first set of propellers and at least one of the fourth set of propellers; and wherein the one or more flight control computers are configured to provide control signals via another electrical bus of the plurality of electrical buses to at least one of the third set of propellers and at least one of the second set of propellers.

[0003b] In an aspect, the present disclosure refers to a method for flight control of an aircraft, the aircraft having one or more flight control computers, a first set of electrically powered propellers and a second set of electrically powered propellers disposed on one side of the fuselage, wherein the first set is disposed forward of the second set, a third set of electrically powered propellers and a fourth set of electrically powered propellers disposed on another side of the fuselage, wherein the third set is disposed forward of the fourth set, and a plurality of electrical buses coupled to the one or more flight control computers, the method comprising:

providing control signals, by the one or more flight control computers, via one electrical bus of the plurality of electrical buses to at least one propeller of the first set of propellers and at least one propeller of the fourth set of propellers; and

providing control signals, by the one or more flight control computers, via another electrical bus of the plurality of electrical buses to at least one propeller of the third set of propellers and at least one propeller of the second set of propellers.

[0003c] In an aspect, the present disclosure refers to an aircraft, comprising:

a fuselage;

one or more flight control computers configured to provide control signals;

a plurality of electrical buses coupled to the one or more flight control computers; and

a plurality of tilt propeller actuators, each configured to tilt a respective electrically powered propeller between vertical lift and forward propulsion configurations, the tilt propeller actuators disposed on opposite sides of the fuselage; and

wherein the one or more flight control computers are configured to provide control signals via a first electrical bus of the plurality of electrical buses for a first pair of tilt propeller actuators disposed substantially symmetrically on either side of the fuselage.

[0003d] In one example, an aircraft is disclosed comprising: a fuselage; one or more flight control computers configured to provide control signals; a first set of electrically powered propellers and a second set of electrically powered propellers disposed on one side of the fuselage, wherein the first set is disposed forward of the second set; a third set of electrically powered propellers and a fourth set of electrically powered propellers disposed on

another side of the fuselage, wherein the third set is disposed forward of the fourth set; and a plurality of electrical buses coupled to the one or more flight control computers; wherein the one or more flight control computers are configured to provide control signals via one electrical bus of the plurality of electrical buses to at least one of the first set of propellers and at least one of the fourth set of propellers; and wherein the one or more flight control computers are configured to provide control signals via another electrical bus of the plurality of electrical buses to at least one of the third set of propellers and at least one of the second set of propellers.

BRIEF DESCRIPTION OF FIGURES

[0004] **Fig. 1** shows an exemplary VTOL aircraft, consistent with disclosed embodiments.

[0005] **Fig. 2** shows an exemplary VTOL aircraft, consistent with disclosed embodiments.

[0006] **Fig. 3** shows an exemplary top plan view of a VTOL aircraft, consistent with disclosed embodiments.

[0007] **Fig. 4** illustrates exemplary propeller rotation of a VTOL aircraft, consistent with disclosed embodiments.

[0008] **Fig. 5** shows exemplary power connections in a VTOL aircraft, consistent with disclosed embodiments.

[0009] **Fig. 6** shows an exemplary architecture of an electric propulsion unit, consistent with disclosed embodiments.

[00010] **Fig. 7** shows an exemplary top plan view of a VTOL aircraft, consistent with disclosed embodiments.

[00011] **Figs. 8A-D** shows an exemplary flight control signaling architecture, consistent with disclosed embodiments.