CLAIMS

1. A method of controlling an electric aircraft that comprises a plurality of actuators that includes a plurality of electric propulsion units and a plurality of battery packs that power the plurality of electric propulsion units, the method comprising:

receiving desired force and moment commands for the electric aircraft;

monitoring energy states of the plurality of battery packs, wherein at least a first battery pack of the plurality of battery packs is electrically isolated from at least a second battery pack of the plurality of battery packs;

determining control commands for the plurality of actuators based on the desired force and moment commands by solving an optimization problem that comprises an energy balance term for balancing energy draw of the electric propulsion units according to the monitored energy state of the plurality of battery packs; and

controlling the plurality of actuators according to the determined control commands to meet the desired force and moment commands of the electric aircraft.

2. The method of claim 1, wherein the first battery pack has a lower remaining energy than the second battery pack, and a first electric propulsion unit powered by the first battery pack operates at a lower power than a second electric propulsion unit powered by the second battery pack.

3. The method of claim 2, wherein the first battery pack and the second battery pack have the same energy capacity.

4. The method of claim 3, wherein the first electric propulsion unit and the second electric propulsion unit have the same power rating.

5. The method of any one of claims 1-4, wherein the energy balance term comprises a set of preferred operating states for the plurality of electric propulsion units, and preferred operating states for electric propulsion units powered by battery packs having lower remaining energy are lower than preferred operating states for electric propulsion units powered by battery packs having higher remaining energy.

6. The method of any one of claims 1-5, wherein the energy balance term comprises a set of penalties for deviating from preferred operating states and a penalty associated with an electric propulsion unit connected to a lower energy battery pack is higher than a penalty associated with an electric propulsion unit connected to a higher energy battery pack.

7. The method of any one of claims 1-6, wherein the optimization problem comprises a noise minimization term for minimizing noise generated by the electric propulsion units.

8. The method of any one of claims 1-7, wherein the electric aircraft is a vertical take-off and landing aircraft.

9. The method of any one of claims 1-8 wherein the electric aircraft is manned.

10. The method of any one of claims 1-9, wherein one or more of the electric propulsion units are configured to provide vertical lift, and one or more of the electric propulsion units are configured to provide forward thrust.

11. The method of any of claims 1-10, wherein at least one electric propulsion unit is configured to tilt from a lift configuration for providing vertical lift to a propulsion configuration for providing forward thrust.

12. The method of any one of claims 1-11, wherein the electric aircraft comprises multiple electric propulsion units on either side of a fuselage of the aircraft.

13. A system for controlling an electric aircraft that comprises a plurality of actuators that includes a plurality of electric propulsion units, the system comprising:

one or more processors;

memory; and

one or more programs stored in the memory for execution by the one or more processors for causing the system to perform the method of any one of claims 1 to 12.

14. An electric aircraft, comprising:

a plurality of actuators that includes a plurality of electric propulsion units; and

the system of claim 13 for controlling the electric aircraft via the plurality of actuators.

15. The electric aircraft of claim 14, wherein the electric aircraft is a vertical take-off and landing aircraft.

16. The electric aircraft of claim 14 or 15, wherein the electric aircraft is manned.

17. The electric aircraft of any one of claims 14-16, comprising multiple electric propulsion units on either side of a fuselage of the electric aircraft.