CLAIMS:

What is claimed is:

1. A system comprising:

an unmanned aerial vehicle (UAV);

at least one sensorless motor of the UAV, the at least one sensorless motor comprising a set of windings and a rotor;

at least one propeller connected to the at least one sensorless motor;

a microcontroller in communication with the at least one sensorless motor,

wherein the microcontroller is configured to:

determine a rotation rate of the at least one propeller;

determine a rotation direction of the at least one propeller;

provide an output to stop the at least one propeller if at least one of: the determined rotation rate is not a desired rotation rate and the determined rotation direction is not a desired rotation direction; and

provide an output to start the at least one propeller if the at least one propeller is stopped at the desired rotation rate and the desired rotation direction;

wherein the determined rotation rate is based on a measured frequency of a back electromotive force (EMF) generated by the at least one sensorless motor; and

wherein stopping the at least one propeller further comprises energizing the at least one sensorless motor with current at a same frequency as the measured frequency of the back-EMF.

~~2. The system of claim 1, wherein the determined rotation rate is based on a measured frequency of a back electromotive force (EMF) generated by the at least one sensorless motor.~~

~~3~~2. The system of claim 1~~2~~, wherein the measured frequency of the back-EMF is measured before the at least one sensorless motor is turned on.

~~4~~3. The system of claim 1~~2~~, wherein the measured frequency of the back-EMF is proportional to the rotation rate of the at least one propeller.

~~5. The system of claim 2, wherein stopping the at least one propeller further comprises energizing the at least one sensorless motor with current at a same frequency as the measured frequency of the back-EMF.~~

~~6~~4. The system of claim 1, wherein the microcontroller is further configured to:

provide an output to continue rotation of the at least one propeller if the determined rotation rate is at the desired rotation rate and the determined rotation direction is at the desired rotation direction.

~~7~~5. The system of claim 1, further comprising:

a wing panel of the UAV, wherein the at least one sensorless motor is attached to the wing panel; and

at least one landing pod, wherein the wing panel is supported by the at least one landing pod.

~~8~~6. The system of claim 1, wherein the UAV is a high altitude long endurance aircraft.

~~9~~7. The system of claim 1, wherein the at least one sensorless motor is a brushless AC motor.

~~10~~8. A method comprising:

determining, by a microcontroller in communication with at least one sensorless motor connected to at least one propeller, a rotation rate of the at least one propeller;

determining, by the microcontroller, a rotation direction of the at least one propeller;

providing, by the microcontroller, an output to stop the at least one propeller if at least one of: the determined rotation rate is not a desired rotation rate

and the determined rotation direction is not a desired rotation direction; and

providing, by the microcontroller, an output to start the at least one propeller if the at least one propeller is stopped at the desired rotation rate and the desired rotation direction;

wherein stopping the at least one propeller further comprises energizing the at least one sensorless motor with current at a same frequency as the measured frequency of a back electromotive force (EMF) generated by the at least one sensorless motor.

~~11~~9. The method of claim ~~10~~8, further comprising:

providing, by the microcontroller, an output to continue rotation of the at least one propeller if the determined rotation rate is at the desired rotation rate and the determined rotation direction is at the desired rotation direction.

~~12~~10. The method of claim ~~10~~8, wherein the determined rotation rate is based on a measured frequency of a back electromotive force (EMF) generated by at least one sensorless motor.

~~13~~11. A method comprising:

measuring, by a microcontroller in communication with at least one sensorless motor connected to at least one propeller, a rotation rate of the at least one propeller while the at least one sensorless motor is unpowered;

determining, by the microcontroller, if the measured rotation rate is above a predetermined threshold;

measuring, by the microcontroller, a rotation direction of the at least one propeller while the at least one sensorless motor is unpowered;

determining, by the microcontroller, if the measured rotation direction is a desired rotation direction; and

providing, by the microcontroller, an output to the at least one sensorless motor to bring the sensorless motor to a desired rotation rate and the desired rotation direction, wherein the output comprises energizing the at

least one sensorless motor with AC power matched in frequency to the measured rotation rate.

~~14. The method of claim 13, wherein the output comprises energizing the at least one sensorless motor with AC power matched in frequency to the measured rotation rate.~~

~~15~~12. The method of claim ~~13~~11, wherein measuring the rotation rate and rotation direction further comprises:

measuring, by the microcontroller, a voltage produced by windings of the at least one sensorless motor due to rotation of the rotor of the at least one sensorless motor while the at least one sensorless motor is unpowered.

~~16~~13. The method of claim ~~13~~11, wherein providing the output further comprises:

stopping, by the microcontroller, a rotation of the at least one sensorless motor if the measured rotation direction is not the desired rotation direction;

starting, by the microcontroller, the rotation of the at least one sensorless motor in the desired rotation direction; and

increasing, by the microcontroller, the rotation rate of the at least one sensorless motor to the desired rotation rate.

~~17~~14. The method of claim ~~13~~11, wherein providing the output further comprises:

adjusting, by the microcontroller, the rotation rate of the at least one sensorless motor to the desired rotation rate if the measured rotation direction is the desired rotation direction.

~~18~~15. The method of claim ~~13~~11, wherein the measured rotation rate is based on a measured frequency of a back electromotive force (EMF) generated by the at least one sensorless motor.

~~19~~16. The method of claim ~~13~~11, wherein the measured rotation rate below the predetermined threshold allows for safe operation of the at least one sensorless motor.

~~20~~17. The method of claim ~~13~~11, wherein the rotation direction is at least one of: clockwise and counterclockwise.

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