WHAT IS CLAIMED IS:

1. An exhaust control system comprising:

a first end configured to connect to an outlet of a propulsor fan that is configured to generate thrust, the first end having a first cross-section shape that substantially matches a cross-section shape of the outlet of the propulsor fan;

a second end having a second cross-section shape that is different from the first cross-section shape, exhaust generated by the propulsor fan configured to exit the second end of the exhaust control system; and

an exhaust area control mechanism configured to vary an area of the second end of the exhaust control system from a first area to a second area that is less than the first area.

2. The exhaust control system of claim 1, wherein the exhaust area control mechanism comprises a plurality of flaperons that are connected to the second end of the exhaust control system.

3. The exhaust control system of claim 2, further comprising:

a transition body configured to transition the exhaust control system from having the first end having the first cross-section shape to the second end having the second cross-section shape that is different from the first cross-section shape, the transition body comprising the first end and the second end,

wherein each of the plurality of flaperons is connected to one of a plurality of edges on the second end of the transition body.

4. The exhaust control system of claim 2, wherein at least one of the plurality of flaperons is configured to actuate independent from another one of the plurality of flaperons.

5. The exhaust control system of claim 2, wherein the plurality of flaperons are configured to actuate simultaneously.

6. The exhaust control system of claim 2, wherein the plurality of flaperons are configured to actuate toward a center of the second end such that an area of the second end is reduced thereby decreasing the thrust of the propulsor fan, and wherein the plurality of flaperons are configured to actuate away from the center of the second end such that the area of the second end is increased thereby increasing the thrust of the propulsor fan.

7. The exhaust control system of claim 2, wherein first cross-section shape comprises a circular cross-section and the second cross-section shape comprises a rectangular cross-section.

8. An exhaust control system comprising:

a first end configured to connect to a propulsor fan that generates thrust;

a second end opposite the first end;

an intermediate portion disposed between the first end and the second end, the intermediate portion having a diameter that is greater than a diameter of the first end and a diameter of the second end; and

an exhaust area control mechanism disposed at the first end, the exhaust area control mechanism configured to adjust a length of the exhaust control system such that a position of the intermediate portion within an outlet of the propulsor fan changes thereby varying an area of the outlet of the propulsor fan.

9. The exhaust control system of claim 8, wherein the exhaust area control mechanism comprises:

a plurality of overlapping concentric rings disposed at the first end, at least a portion of each of the plurality of concentric rings overlapping a portion of another one of the plurality of concentric ring,

wherein the length of the exhaust control system is adjusted responsive to an adjustment of an amount of overlap between the plurality of concentric rings.

10. The exhaust control system of claim 9, further comprising:

a control mechanism connected to the second end, the control mechanism configured to adjust the amount of overlap between the plurality of concentric rings to vary the area of the outlet of the propulsor fan.

11. The exhaust control system of claim 10, wherein the control mechanism is configured to increase the amount of overlap between the plurality of concentric rings to reduce the length of the exhaust control system such that the intermediate portion is closer to the first end thereby increasing the area of the outlet of the propulsor fan to increase thrust.

12. The exhaust control system of claim 10, wherein the control mechanism is configured to decrease the amount of overlap between the plurality of concentric rings to increase the length of the exhaust control system such that the intermediate portion is farther

from the first end thereby decreasing the area of the outlet of the propulsor fan to decrease thrust.

13. A propulsor system comprising:

a propulsor fan configured to generate thrust, the propulsor fan including an outlet having a first cross-section shape; and

an exhaust control system configured to vary an area of an outlet of the propulsor system, the exhaust control system comprising:

an inlet connected to the outlet of the propulsor fan, the outlet of the propulsor fan and the inlet of the exhaust control system having a first cross-section shape;

an outlet having a second cross-section shape that is different from the first cross-section shape, exhaust generated by the propulsor system configured to exit the outlet of the exhaust control system; and

a first exhaust area control mechanism configured to vary an area of the outlet of the exhaust control system from a first area to a second area that is less than the first area

14. The propulsor system of claim 13, wherein the first exhaust area control mechanism comprises a plurality of flaperons that are connected to the outlet of the exhaust control system.

15. The propulsor system of claim 14, wherein the first exhaust control system further comprises:

a transition body configured to transition the exhaust control system from having the inlet having the first cross-section shape to the outlet having the second cross-section shape that is different from the first cross-section shape,

wherein each of the plurality of flaperons is connected to one of a plurality of edges on the outlet of the transition body.

16. The propulsor system of claim 14, wherein at least one of the plurality of flaperons is configured to actuate independent from another one of the plurality of flaperons.

17. The propulsor system of claim 14, wherein the plurality of flaperons are configured to actuate simultaneously.

18. The propulsor system of claim 14, wherein the plurality of flaperons are configured to actuate toward a center of the outlet of the exhaust control system such that an area of the outlet of the exhaust control system is reduced thereby decreasing the thrust of the propulsor fan, and wherein the plurality of flaperons are configured to actuate away from the

~~center of the outlet of the exhaust control system such that the area of the outlet of the exhaust control system is increased thereby increasing the thrust of the propulsor fan.~~

~~19. The propulsor system of claim 13, wherein first cross-section shape comprises a circular cross-section and the second cross-section shape comprises a rectangular cross-section.~~

~~20. The propulsor system of claim 13, further comprising a second exhaust control system disposed within the outlet of the propulsor fan, wherein a length of the second exhaust control system is adjusted to vary an area of the outlet of the propulsor fan.~~

1. An exhaust control system comprising:

a transition body configured to be connected to an outlet of a propulsor fan and disconnected from the outlet of the propulsor fan, the propulsor fan including an inlet having a first end and a second end, an intermediate portion having a first end that is connected to the second end of the inlet and a second end, and an outlet having a first end that is connected to the second end of the intermediate portion and a second end, the transition body comprising:

a first end of the transition body configured to connect to the second end of the outlet of the propulsor fan that is configured to generate thrust and to disconnect from the second end of the outlet of the propulsor fan, the first end of the transition body having a first cross-section shape that substantially matches a cross-section shape of the outlet of the propulsor fan; and

a second end of the transition body having a second cross-section shape that is different from the first cross-section shape, exhaust generated by the propulsor fan configured to exit the second end of the transition body; and

an exhaust area control mechanism connected to the second end of the transition body, the exhaust area control mechanism configured to vary an area of the second end of the exhaust control system from a first area to a second area that is less than the first area.

2. The exhaust control system of claim 1, wherein the exhaust area control mechanism comprises a plurality of flaperons that are connected to the second end of the transition body.

3. The exhaust control system of claim 2,

wherein each of the plurality of flaperons is connected to one of a plurality of edges on the second end of the transition body.

4. The exhaust control system of claim 2, wherein at least one of the plurality of flaperons is configured to actuate independent from another one of the plurality of flaperons.

5. The exhaust control system of claim 2, wherein the plurality of flaperons are configured to actuate simultaneously.

6. The exhaust control system of claim 2, wherein the plurality of flaperons are configured to actuate toward a center of the second end such that an area of the second end is reduced thereby decreasing the thrust of the propulsor fan, and wherein the plurality of flaperons are configured to actuate away from the center of the second end such that the area of the second end is increased thereby increasing the thrust of the propulsor fan.

7. The exhaust control system of claim 2, wherein first cross-section shape comprises a circular cross-section and the second cross-section shape comprises a rectangular cross-section.

8. An exhaust control system comprising:

a tail cone configured to be directly connected to a stator of a propulsor fan, the tail cone including:

a first end of the tail cone having a plurality of concentric rings including a first ring and a second ring, the first ring including a first end that is configured to connect to the stator of the propulsor fan and a second end that is opposite the first end of the first ring, and the second ring including a first end that overlaps the second end of the first ring such that the second end of the first ring is inserted into the first end of the second ring and a second end of the second ring;

a second end of the tail cone that is opposite the first end; and

an intermediate portion having an end and the second end of the second ring is inserted into the end of the intermediate portion, and the intermediate portion is disposed between the second end of the second ring and the second end of the tail cone, the intermediate portion having a diameter that is greater than a diameter of the first end of the tail cone and a diameter of the second end of the tail cone; and

an exhaust area control mechanism configured to adjust an amount of overlap between the second end of the first ring and the first end of the second ring of the tail cone and adjust an amount of overlap between the second end of

the second ring and the intermediate portion of the tail cone to adjust a length of the tail cone such that a position of the intermediate portion within an outlet of the propulsor fan changes thereby varying an area of the outlet of the propulsor fan.

9. The exhaust control system of claim 8, wherein the exhaust area control mechanism is connected to the second end of the tail cone.

10. The exhaust control system of claim 10, wherein the exhaust area control mechanism is configured to increase the amount of overlap between the plurality of concentric rings to reduce the length of the tail cone such that the intermediate portion is closer to the first end thereby increasing the area of the outlet of the propulsor fan to increase thrust.

11. The exhaust control system of claim 10, wherein the exhaust area control mechanism is configured to decrease the amount of overlap between the plurality of concentric rings to increase the length of the tail cone such that the intermediate portion is farther from the first end thereby decreasing the area of the outlet of the propulsor fan to decrease thrust.

12. A propulsor system comprising:

a propulsor fan configured to generate thrust, the propulsor fan including an inlet having a first end and a second end, an intermediate portion having a first end that is connected to the second end of the inlet and a second end, and an outlet having a first end that is connected to the second end of the intermediate portion and a second end having a first cross-section shape; and

an exhaust control system configured to vary an area of the outlet of the propulsor system, the exhaust control system comprising:

a transition body configured to connect to the second end of the outlet of the propulsor fan and to disconnect from the second end of the outlet of the propulsor fan, the transition body comprising:

an inlet of the transition body that is connected to the second end of the outlet of the propulsor fan, the second end of the outlet of the propulsor fan and the inlet of the transition body having the first cross-section shape;

an outlet of the transition body having a second cross-section shape that is different from the first cross-section shape, exhaust generated by the propulsor system configured to exit the outlet of the transition body; and

a first exhaust area control mechanism connected to the outlet of the transition body, the first exhaust area control mechanism configured to vary an area of the outlet of the exhaust control system from a first area to a second area that is less than the first area.

13. The propulsor system of claim 12, wherein the first exhaust area control mechanism comprises a plurality of flaperons that are connected to the outlet of the transition body.

14. The propulsor system of claim 13,

wherein each of the plurality of flaperons is connected to one of a plurality of edges on the outlet of the transition body.

15. The propulsor system of claim 13, wherein at least one of the plurality of flaperons is configured to actuate independent from another one of the plurality of flaperons.

16. The propulsor system of claim 13, wherein the plurality of flaperons are configured to actuate simultaneously.

17. The propulsor system of claim 13, wherein the plurality of flaperons are configured to actuate toward a center of the outlet of the transition body such that an area of the outlet of the transition body is reduced thereby decreasing the thrust of the propulsor fan, and wherein the plurality of flaperons are configured to actuate away from the center of the outlet of the transition body such that the area of the outlet of the transition body is increased thereby increasing the thrust of the propulsor fan.

18. The propulsor system of claim 12, wherein first cross-section shape comprises a circular cross-section and the second cross-section shape comprises a rectangular cross-section.

19. The propulsor system of claim 12, further comprising a second exhaust control system disposed within the outlet of the propulsor fan, wherein a length of the second exhaust control system is adjusted to vary an area of the outlet of the propulsor fan.

20. The exhaust control system of claim 6, wherein a minimum area of the outlet of the propulsor fan corresponds to a first position of the plurality of flaperons being actuated toward the center of the second end, and a maximum area of the outlet of the propulsor fan corresponds to a second position of the plurality of flaperons being actuated away from the center of the second end.

21. The exhaust control system of claim 11, wherein a minimum area of the outlet of the propulsor fan corresponds to a first position of a part of the intermediate portion having

a maximum diameter being aligned with a trailing edge of the outlet of the propulsor fan and a maximum area of the outlet of the propulsor fan corresponds to a second position of the part of the intermediate portion being inset from the trailing edge of the outlet of the propulsor fan while a maximum amount of overlap is between the plurality of concentric rings.