An engine system has a gas generator, a bi-fi wall surrounding at least a portion of the gas generator, a casing surrounding a fan, and the casing having first and second thrust reverser doors which in a deployed position abut each other and the bi-fi wall.

16 Claims, 6 Drawing Sheets
References Cited

U.S. PATENT DOCUMENTS

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FIG. 7A

FIG. 7B
REVERSE CORE ENGINE WITH THRUST REVERSER

STATEMENT OF GOVERNMENT INTEREST

The Government of the United States of America may have rights in the present invention as a result of NASA Cooperative Agreement Contract No. NNX11AB35A and Sub-Contract No. MIT/PW Subaward No. 5710002937 awarded by NASA.

BACKGROUND

The present disclosure relates to a thrust reverser to be used with a reverse core engine in a double bubble airframe. In many airplanes, the engines are located under the wing. Upon landing such aircraft, thrust reversers on the engines are used to slow the aircraft. The thrust reversers have many different configurations such as clamshells or bucket configuration.

In certain aircraft configurations, the engines must be situated in other locations on the aircraft. Thus, it becomes necessary to reconfigure engine elements such as the thrust reversers.

SUMMARY

In accordance with the present disclosure, there is provided an engine system comprising: a gas generator; a hi-fi wall surrounding at least a portion of the gas generator; a casing surrounding a fan; and the casing having first and second thrust reverser doors which in a deployed position abut each other and the hi-fi wall.

In another and alternative embodiment, the gas generator has a reverse engine core.

In another and alternative embodiment, the engine system further comprises the casing having an arcuate shape and each of the first and second thrust reverser doors having a curved shape to conform to the arcuate shape of the casing.

In another and alternative embodiment, each of the first and second thrust reverser doors forms a portion of the casing when in a stowed position.

In another and alternative embodiment, each of the first and second thrust reverser doors has an asymmetrically contoured rear edge to minimize leaks between the first and second thrust reverser doors and the hi-fi wall.

In another and alternative embodiment, the aircraft further comprises at least one aerodynamic fairing located at the tail section.

In another and alternative embodiment, the aircraft further comprises the at least one aerodynamic fairing housing an intake for supplying air to the at least one gas generator.

In another and alternative embodiment, the intake provides free stream air to the at least one gas generator.

In another and alternative embodiment, the aircraft further comprises the fuselage having at least one inlet channel for supplying air to the fan.

Other details of the reverse core engine with the thrust reverser are set forth in the following detailed description and the accompanying drawings wherein like reference numerals depict like elements.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic representation of an aircraft; FIG. 2 is a schematic representation of the location of the reverse core engines in the tail of the aircraft; FIG. 3 is a sectional view of a reverse core engine to be used in the aircraft of FIG. 1; FIG. 4 is a schematic view of the rear portion of the aircraft fuselage of FIG. 1; FIG. 5A is a perspective view showing the thrust reverser doors in a stowed position; FIG. 5B is a rear view showing the thrust reverser doors in a deployed position; FIGS. 6A-6C show the movement of the thrust reverser doors from a stowed position to a fully deployed position; FIG. 7A shows the thrust reverser doors in a stowed position; and FIG. 7B shows the thrust reverser doors in a deployed position.

DETAILED DESCRIPTION

FIG. 1 illustrates an aircraft 10 having a fuselage 12, wings 14, and a tail 15 having vertical tail surfaces 16 and a tail wing 18 mounted to the tail surfaces 16. As shown in FIG. 2, a pair of propulsors 20, which is a pair of gas turbine engines, is mounted to the fuselage 12 at the base of the tail 15. The inlet 44 to each of the propulsors 20 includes a tail wing 18 and a free turbine and at least one gas generator for supplying a fluid to drive the free turbine and said fan; a hi-fi wall housing at least a portion of the at least one gas generator; and the casing having first and second thrust reverser doors which in a deployed position abut each other and the hi-fi wall.

In another and alternative embodiment, the at least one casing has an arcuate shape and each of the first and second thrust reverser doors has a curved shape to conform to the arcuate shape of the casing.

In another and alternative embodiment, each of the first and second thrust reverser doors forms a portion of the at least one casing when in a stowed position.

In another and alternative embodiment, each of the first and second thrust reverser doors has an asymmetrically contoured rear edge to minimize leaks between the first and second thrust reverser doors and the hi-fi wall when in the deployed position.

In another and alternative embodiment, the first and second thrust reverser doors in a deployed position abut each other along an inner edge and are spaced from each other along an outer edge so as to abut the hi-fi wall.

In another and alternative embodiment, the aircraft further comprises at least one aerodynamic fairing located at the tail section.

In another and alternative embodiment, the aircraft further comprises the at least one aerodynamic fairing housing an intake for supplying air to the at least one gas generator.

In another and alternative embodiment, the intake provides free stream air to the at least one gas generator.

In another and alternative embodiment, the aircraft further comprises the fuselage having at least one inlet channel for supplying air to the fan.

Other details of the reverse core engine with the thrust reverser are set forth in the following detailed description and the accompanying drawings wherein like reference numerals depict like elements.

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DETAILED DESCRIPTION

FIG. 1 illustrates an aircraft 10 having a fuselage 12, wings 14, and a tail 15 having vertical tail surfaces 16 and a tail wing 18 mounted to the tail surfaces 16. As shown in FIG. 2, a pair of propulsors 20, which is a pair of gas turbine engines, is mounted to the fuselage 12 at the base of the tail 15. The inlet 44 to each of the propulsors 20 includes a tail wing 18 and a free turbine and at least one gas generator for supplying a fluid to drive the free turbine and said fan; a hi-fi wall housing at least a portion of the at least one gas generator; and the casing having first and second thrust reverser doors which in a deployed position abut each other and the hi-fi wall.
There has been provided a reverse core engine with a thrust reverser. While the reverse core engine with a thrust reverser has been described in the context of specific embodiments thereof, other unforeseen alternatives, modifications, and variations may become apparent to those skilled in the art having read the foregoing description. Accordingly, it is intended to embrace those alternatives, modifications, and variations as fall within the broad scope of the appended claims.

What is claimed is:
1. An engine system comprising:
   a gas generator;
   a bi-fi wall surrounding at least a portion of said gas generator;
   a casing surrounding a fan; and
   said casing having first and second thrust reverser doors having a curved shape to conform to said arcuate shape of said casing.

2. The engine system according to claim 1, wherein said gas generator has a reverse engine core.

3. The engine system of claim 1, further comprising said casing having an arcuate shape and each of said first and second thrust reverser doors having a curved shape to conform to said arcuate shape of said casing.

4. The engine system of claim 3, wherein each of said first and second thrust reverser doors forms a portion of said said casing when in said stowed position.

5. The engine system of claim 1, wherein said first and second thrust reverser doors form a deployed position in said stowed position.

6. The engine system of claim 1, further comprising at least one aerodynamic fairing and said aerodynamic fairing housing an intake for supplying air to said gas generator.

7. The engine system of claim 6, wherein said intake is an intake which provides free stream air to said gas generator.

8. An aircraft comprising:
   a fuselage and a tail section;
   an engine system comprising at least one casing housing at least a portion of said at least one gas generator and a fan and a free turbine and at least one gas generator for supplying a fluid to drive said free turbine and said fan;
   a bi-fi wall housing at least a portion of said at least one gas generator; and
   said casing having first and second thrust reverser doors in a deployed position abut each other along an inner edge and are spaced from each other along an outer edge so as to abut the bi-fi wall.

9. The aircraft of claim 8, wherein said at least one casing has an arcuate shape and each of said first and second thrust reverser doors has a curved shape to conform to said arcuate shape of said casing.

10. The aircraft of claim 9, wherein each of said first and second thrust reverser doors has an asymmetrically contoured rear edge to minimize leaks between said first and said second thrust reverser doors and said bi-fi wall when in said deployed position.

11. The aircraft of claim 8, wherein said first and second thrust reverser doors in a deployed position abut each other along an inner edge and are spaced from each other along an outer edge so as to abut the bi-fi wall.
12. The aircraft of claim 8, further comprising at least one aerodynamic fairing located at said tail section.

13. The aircraft of claim 12, further comprising said at least one aerodynamic fairing housing an intake for supplying air to said at least one gas generator.

14. The aircraft of claim 13, wherein said intake is an intake which provides free stream air to said at least one gas generator.

15. The aircraft of claim 8, further comprising said fuselage having at least one inlet channel for supplying free stream air to said fan.

16. An engine system comprising:
   a gas generator;
   a hi-fi wall surrounding at least a portion of said gas generator;
   a casing surrounding a fan; and
   said casing having first and second thrust reverser doors which in a deployed position abut each other and said hi-fi wall.