CLAIMS

What is claimed is:

1. A gas turbine engine thrust reverser system comprising:

a fan nacelle having a fixed portion and a movable portion configured to move relative to the fixed portion between opened and closed positions in response to a command to selectively provide an opening between the fixed and movable portions; and

a fan case arranged within the fan nacelle, the fan case including an integral bull nose adjacent to the opening in the open position and to the movable portion in the closed position, the bull nose having a curved wall sloping radially outward.

2. The gas turbine engine thrust reverser system according to claim 1, comprising a thrust reverser mechanism including an actuator operatively connected to the movable portion, and a controller is in communication with the actuator and is configured to provide the command.

3. The gas turbine engine thrust reverser system according to claim 2, wherein the thrust reverser mechanism includes a cascade array arranged in a cavity of the movable portion in the closed position and arranged in the opening in the open condition.

4. The gas turbine engine thrust reverser system according to claim 3, comprising a core nacelle, and a bypass flow path arranged between the core and fan nacelles and configured to receive a bypass flow, the bypass flow redirected through the cascade array with the movable portion in the open position.

5. The gas turbine engine thrust reverser system according to claim 4, wherein the thrust reverser mechanism includes blocker doors supported by the movable portion, the blocker doors are configured to move between stowed and deployed positions in response to the command, the blocker doors obstruct the bypass flow path in the deployed position with the movable portion in the open position.

6. The gas turbine engine thrust reverser system according to claim 1, wherein the fan case and bull nose are constructed from a forged metal alloy.

7. The gas turbine engine thrust reverser system according to claim 1, wherein the movable portion includes a seal support to which a seal is mounted, the seal engages the bull nose with the movable portion in the closed position.

8. The gas turbine engine thrust reverser system according to claim 7, comprising a thrust reverser mechanism that includes blocker doors supported by the movable portion, the blocker doors are configured to move between stowed and deployed positions in response to the command, the blocker doors engage the seal and obstruct the bypass flow path in the deployed position with the movable portion in the open position.

9. The gas turbine engine thrust reverser system according to claim 7, wherein the fixed portion includes outer and inner nacelle walls, the inner nacelle wall includes a shell arranged between the curved wall and the seal.

10. The gas turbine engine thrust reverser system according to claim 1, wherein the fixed portion includes outer and inner nacelle walls, the bull nose has an annular recess receiving a seal, and a support flange is secured to the outer nacelle wall and engages the seal.

11. The gas turbine engine thrust reverser system according to claim 10, comprising a thrust reverser mechanism that includes a cascade array arranged in a cavity of the movable portion in the closed position and arranged in the opening in the open condition, the cascade array mounted to the support flange.

12. The gas turbine engine thrust reverser system according to claim 1, comprising struts integral with the fan case and configured to be arranged aft of a fan section disposed within the fan case.

13. The gas turbine engine thrust reverser system according to claim 12, wherein the struts extend from the bull nose.

14. The gas turbine engine thrust reverser system according to claim 13, comprising circumferentially spaced flow exit guide vanes arranged axially between the fan section and the struts, the flow exit guide vanes secured to the fan case by fasteners.

15. The gas turbine engine thrust reverser system according to claim 14, comprising a mount provided on the fan case near the flow exit guide vanes and configured to secure to a pylon.

16. A gas turbine engine comprising:

a fan nacelle having a fixed portion and a movable portion configured to move relative to the fixed portion between opened and closed positions in response to a command to selectively provide an opening between the fixed and movable portions;

a fan section; and

a fan case arranged within the fan nacelle and surrounding the fan section, the fan case including an integral bull nose adjacent to the opening in the open position and to the movable portion in the closed position, the bull nose having a curved wall sloping radially outward.

17. The gas turbine engine according to claim 16, comprising a core supported by the fan case by struts, low and high spools arranged in the core, low pressure compressor and turbine sections mounted on the low spool, and high pressure compressor and turbine sections mounted on the high spools.

18. The gas turbine engine according to claim 17, comprising a geared architecture interconnecting the low spool to the fan section.

19. The gas turbine engine according to claim 17, wherein the struts are integral with the fan case, and circumferentially arranged flow exit guide vanes are secured to the fan case between the struts and the fan section and extend radially inward to the core.

20. The gas turbine engine according to claim 16, comprising a core nacelle, a bypass flow path arranged between the core and fan nacelles and configured to receive a bypass flow, and a thrust reverser mechanism includes a cascade array arranged in a cavity of the movable portion in the closed position and arranged in the opening in the open condition, the bypass flow redirected through the cascade array with the movable portion in the open position.

CLAIMS

1. A gas turbine engine thrust reverser system comprising:

a fan nacelle having a fixed portion and a movable portion configured to move relative to the fixed portion between opened and closed positions in response to a command to selectively provide an opening between the fixed and movable portions;

a fan case arranged within the fan nacelle, the fan case including a wall that has an integral bull nose adjacent to the opening in the open position and to the movable portion in the closed position, the bull nose provided by a curved wall at a terminal end of the wall, the curved portion sloping radially outward;

a core supported by the fan case by struts; and

circumferentially spaced flow exit guide vanes mounted to the wall, wherein the flow exit guide vanes are secured to the fan case between the struts and the fan section and extend radially inward to the core.

2. The gas turbine engine thrust reverser system according to claim 1, comprising a thrust reverser mechanism including an actuator operatively connected to the movable portion, and a controller is in communication with the actuator and is configured to provide the command.

3. The gas turbine engine thrust reverser system according to claim 2, wherein the thrust reverser mechanism includes a cascade array arranged in a cavity of the movable portion in the closed position and arranged in the opening in the open condition.

4. The gas turbine engine thrust reverser system according to claim 3, comprising a core nacelle, and a bypass flow path arranged between the core and fan nacelles and configured to receive a bypass flow, the bypass flow redirected through the cascade array with the movable portion in the open position, the flow exit guide vanes arranged in the bypass flow path.

5. The gas turbine engine thrust reverser system according to claim 4, wherein the thrust reverser mechanism includes blocker doors supported by the movable portion, the blocker doors are configured to move between stowed and deployed positions in response to the command, the blocker doors obstruct the bypass flow path in the deployed position with the movable portion in the open position.

6. The gas turbine engine thrust reverser system according to claim 1, wherein the fan case and bull nose are constructed from a forged metal alloy.

7. The gas turbine engine thrust reverser system according to claim 1, wherein the movable portion includes a seal support to which a seal is mounted, the seal engages the bull nose with the movable portion in the closed position.

8. The gas turbine engine thrust reverser system according to claim 7, comprising a thrust reverser mechanism that includes blocker doors supported by the movable portion, the blocker doors are configured to move between stowed and deployed positions in response to the command, the blocker doors engage the seal and obstruct the bypass flow path in the deployed position with the movable portion in the open position.

9. The gas turbine engine thrust reverser system according to claim 7, wherein the fixed portion includes outer and inner nacelle walls, the inner nacelle wall includes a shell arranged between the curved wall and the seal.

10. The gas turbine engine thrust reverser system according to claim 1, wherein the fixed portion includes outer and inner nacelle walls, the curved wall terminates in an edge that has an annular recess receiving a seal, and a support flange is secured to the outer nacelle wall and engages the seal.

11. The gas turbine engine thrust reverser system according to claim 10, comprising a thrust reverser mechanism that includes a cascade array arranged in a cavity of the movable portion in the closed position and arranged in the opening in the open condition, the cascade array mounted to the support flange.

12. The gas turbine engine thrust reverser system according to claim 1, comprising struts integral with the fan case and configured to be arranged aft of a fan section disposed within the fan case.

13. The gas turbine engine thrust reverser system according to claim 12, wherein the struts extend from the bull nose.

14. The gas turbine engine thrust reverser system according to claim 13, wherein the flow exit guide vanes are arranged axially between the fan section and the struts, the flow exit guide vanes secured to the fan case by fasteners.

15. The gas turbine engine thrust reverser system according to claim 14, comprising a mount provided on the fan case near the flow exit guide vanes and configured to secure to a pylon.

16. A gas turbine engine comprising:

a fan nacelle having a fixed portion and a movable portion configured to move relative to the fixed portion between opened and closed positions in response to a command to selectively provide an opening between the fixed and movable portions;

a fan section;

a fan case arranged within the fan nacelle and surrounding the fan section, the fan case including a wall that has an integral bull nose, the fan case adjacent to the opening in the open position and to the movable portion in the closed position, the bull nose provided by a curved portion at a terminal end of a wall sloping radially outward;

a core supported by the fan case by struts; and,

circumferentially spaced flow exit guide vanes mounted to the wall, wherein the flow exit guide vanes are secured to the fan case between the struts and the fan section and extend radially inward to the core.

17. The gas turbine engine according to claim 16, comprising low and high spools arranged in the core, low pressure compressor and turbine sections mounted on the low spool, and high pressure compressor and turbine sections mounted on the high spools.

18. The gas turbine engine according to claim 17, comprising a geared architecture interconnecting the low spool to the fan section.

19. The gas turbine engine according to claim 17, wherein the struts are integral with the fan case.

20. The gas turbine engine according to claim 16, comprising a core nacelle, a bypass flow path arranged between the core and fan nacelles and configured to receive a bypass flow, and a thrust reverser mechanism includes a cascade array arranged in a cavity of the movable portion in the closed position and arranged in the opening in the open condition, the bypass flow redirected through the cascade array with the movable portion in the open position.