[0008] The engine 20 in one example is a high-bypass geared aircraft engine. In a further example, the engine 20 bypass ratio is greater than about six (6), with an example embodiment being greater than ten (10), the geared architecture 48 is an epicyclic gear train, such as a planetary gear system or other gear system, with a gear reduction ratio of greater than about 2.3 and the low pressure turbine 46 has a pressure ratio that is greater than about 5. In one disclosed embodiment, the engine 20 bypass ratio is greater than about ten (10:1), the fan diameter is significantly larger than that of the low pressure compressor 44, and the low pressure turbine 46 has a pressure ratio that is greater than about 5:1. Low pressure turbine 46 pressure ratio is pressure measured prior to inlet of low pressure turbine 46 as related to the pressure at the outlet of the low pressure turbine 46 prior to an exhaust nozzle. The geared architecture 48 may be an epicycle gear train, such as a planetary gear system or other gear system, with a gear reduction ratio of greater than about 2.5:1. It should be understood, however, that the above parameters are only exemplary of one embodiment of a geared architecture engine and that the present invention is applicable to other gas turbine engines including direct drive turbofans.

[0009] A significant amount of thrust is provided by the bypass flow B due to the high bypass ratio. The fan section 22 of the engine 20 is designed for a particular flight condition -- typically cruise at about 0.8 Mach and about 35,000 feet. The flight condition of 0.8 Mach and 35,000 ft, with the engine at its best fuel consumption - also known as "bucket cruise Thrust Specific Fuel Consumption ('TSFC')" - is the industry standard parameter of lbm of fuel being burned divided by lbf of thrust the engine produces at that minimum point. "Low fan pressure ratio" is the pressure ratio across the fan blade alone, without a Fan Exit Guide Vane ("FEGV") system. The low fan pressure ratio as disclosed herein according to one non-limiting embodiment is less than about 1.45. "Low corrected fan tip speed" is the actual fan tip speed in ft/sec divided by an industry standard temperature correction of [(Tambient deg R) / 518.7)^0.5]. The "Low corrected fan tip speed" as disclosed herein according to one non-limiting embodiment is less than about 1150 ft / second.

[0010] Figure 2 shows a portion of the gas turbine engine 20. In particular, an outer housing, known as a splitter 80 defines an outer periphery for the core flow path C. A row of stator vanes 82 is positioned at a forward end. Air from the fan blade is divided into the bypass

CLAIMS

1. A gas turbine engine comprising:

a fan;

a turbine operatively connected to the fan;

an inner core housing having an inner periphery;

a splitter housing having an outer periphery, the inner periphery of the inner core housing and the outer periphery of the splitter housing defining a core path;

a plurality of inlet stator vanes located in the core path;

wherein the inner periphery of the inner core housing, the outer periphery of the splitter housing and the plurality of inlet stator vanes define a flow area having a hydraulic diameter, the hydraulic diameter of the flow area being greater than or equal to about 1.5.

2. The gas turbine engine as set forth in claim 1, wherein said hydraulic diameter is greater than or equal to about 1.7.

3. The gas turbine engine as set forth in claim 1, wherein said turbine is a low pressure turbine which also drives a low pressure compressor, and said fan as a low spool.

4. The gas turbine engine as set forth in claim 3, wherein said low spool drives said fan through a gear reduction.

5. The gas turbine engine as set forth in claim 4, wherein said gear reduction is positioned inwardly of said inner core housing.

6. The gas turbine engine as set forth in claim 4, wherein said gear reduction has a gear reduction ratio greater than 2.3.

7. The gas turbine engine as set forth in claim 6, wherein said gear reduction has a gear ratio of greater than 2.5.

8. The gas turbine engine as set forth in claim 1, wherein said fan also delivering air into a bypass duct.

9. The gas turbine engine as set forth in claim 8, wherein a bypass ratio of the amount of air delivered into said bypass duct compared to the amount of air delivered into said core path is greater than about 6.

10. The gas turbine engine as set forth in claim 9, wherein said bypass ratio is greater than 10.

11. The gas turbine engine as set forth in claim 1, wherein said fan has an outer diameter that is larger than an outer diameter of the rotors in said low pressure compressor.

12. The gas turbine engine as set forth in claim 1, wherein said low pressure turbine has a pressure ratio that is greater than about 5:1.

13. A gas turbine engine comprising:

a fan delivering air into a core path and into a bypass duct as bypass air, said air in said core path reaching a low pressure compressor, and then a high pressure compressor, air compressed by said high pressure compressor being delivered into a combustion section where it is mixed with fuel and ignited, products of the combustion passing downstream over a high pressure turbine and then a low pressure turbine, said low pressure turbine driving said low pressure compressor as a low spool, and a gear reduction being driven by said low spool to in turn drive said fan at a rate of speed lower than that of said low spool, said gear reduction being positioned inwardly of an inner core housing which defines an inner periphery of the core path, and;

a splitter housing defining an outer periphery of the core path, a plurality of inlet stator vanes extending between said splitter and said inner core housing, and there being a flow area between adjacent stator vanes, wherein a hydraulic diameter is defined as:

$$\text{Hydraulic diameter} = (4 \times A)/(O + L + I + L),$$

wherein A is the area between the trailing edge of one vane, the leading edge of an adjacent vane, the inner periphery of the splitter, and the outer periphery of the inner core housing, L is the length of the leading edge of each vane, O is the length of the inner periphery of the vanes and I is the length of the outer periphery between adjacent vanes, and wherein said hydraulic diameter is greater than or equal to about 1.5.

14. The gas turbine engine as set forth in claim 13, wherein said hydraulic diameter is greater than or equal to about 1.7.

15. The gas turbine engine as set forth in claim 14, wherein said gear reduction is positioned inwardly of said inner core housing.

16. The gas turbine engine as set forth in claim 15, wherein a bypass ratio of the amount of air delivered into said bypass duct compared to the amount of air delivered into said core path is greater than about 6.

17. The gas turbine engine as set forth in claim 16, wherein said bypass ratio is greater than 10.

18. The gas turbine engine as set forth in claim 17, wherein said gear reduction has a gear reduction ratio greater than 2.3.

19. The gas turbine engine as set forth in claim 13, wherein said low pressure turbine has a pressure ratio that is greater than about 5:1.

20. The gas turbine engine as set forth in claim 13, wherein said gear reduction has a gear reduction ratio greater than 2.3.

21. A compressor module comprising:

a compressor rotor;

a plurality of inlet stator vanes adjacent the rotor; and

a flow area defined between leading edges of two adjacent stator vanes, and an outer boundary and an inner boundary, the hydraulic diameter being greater than or equal to about 1.5.

22. A module as set forth in claim 21, wherein said hydraulic diameter is greater than or equal to about 1.7.

[0008] The engine 20 in one example is a high-bypass geared aircraft engine. In a further example, the engine 20 bypass ratio is greater than about six (6), with an example embodiment being greater than ten (10), the geared architecture 48 is an epicyclic gear train, such as a planetary gear system or other gear system, with a gear reduction ratio of greater than about 2.3 and the low pressure turbine 46 has a pressure ratio that is greater than about 5. In one disclosed embodiment, the engine 20 bypass ratio is greater than about ten (10:1), the fan diameter is significantly larger than that of the low pressure compressor 44, and the low pressure turbine 46 has a pressure ratio that is greater than about 5:1. Low pressure turbine 46 pressure ratio is pressure measured prior to inlet of low pressure turbine 46 as related to the pressure at the outlet of the low pressure turbine 46 prior to an exhaust nozzle. The geared architecture 48 may be an epicycle gear train, such as a planetary gear system or other gear system, with a gear reduction ratio of greater than about 2.5:1. It should be understood, however, that the above parameters are only exemplary of one embodiment of a geared architecture engine and that the present invention is applicable to other gas turbine engines including direct drive turbofans.

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CLAIMS

1. A gas turbine engine comprising:

a fan;

a turbine operatively connected to the fan;

an inner core housing having an outer periphery;

a splitter housing having an inner periphery, the outer periphery of the inner core housing and the inner periphery of the splitter housing defining a core path;

a plurality of inlet stator vanes located in the core path;

wherein the outer periphery of the inner core housing, the inner periphery of the splitter housing and the plurality of inlet stator vanes define a flow area having a hydraulic diameter, the hydraulic diameter of the flow area being greater than or equal to about 1.5.

2. The gas turbine engine as set forth in claim 1, wherein said hydraulic diameter is greater than or equal to about 1.7.

3. The gas turbine engine as set forth in claim 1, wherein said turbine is a low pressure turbine which also drives a low pressure compressor, and said fan as a low spool.

4. The gas turbine engine as set forth in claim 3, wherein said low spool drives said fan through a gear reduction.

5. The gas turbine engine as set forth in claim 4, wherein said gear reduction is positioned inwardly of said inner core housing.

6. The gas turbine engine as set forth in claim 4, wherein said gear reduction has a gear reduction ratio greater than 2.3.

7. The gas turbine engine as set forth in claim 6, wherein said gear reduction has a gear ratio

of greater than 2.5.

8. The gas turbine engine as set forth in claim 1, wherein said fan also delivering air into a bypass duct.

9. The gas turbine engine as set forth in claim 8, wherein a bypass ratio of the amount of air delivered into said bypass duct compared to the amount of air delivered into said core path is greater than about 6.

10. The gas turbine engine as set forth in claim 9, wherein said bypass ratio is greater than 10.

11. The gas turbine engine as set forth in claim 1, wherein said fan has an outer diameter that is larger than an outer diameter of the rotors in said low pressure compressor.

12. The gas turbine engine as set forth in claim 1, wherein said low pressure turbine has a pressure ratio that is greater than about 5:1.

13. A gas turbine engine comprising:

a fan delivering air into a core path and into a bypass duct as bypass air, said air in said core path reaching a low pressure compressor, and then a high pressure compressor, air compressed by said high pressure compressor being delivered into a combustion section where it is mixed with fuel and ignited, products of the combustion passing downstream over a high pressure turbine and then a low pressure turbine, said low pressure turbine driving said low pressure compressor as a low spool, and a gear reduction being driven by said low spool to in turn drive said fan at a rate of speed lower than that of said low spool, said gear reduction being positioned inwardly of an inner core housing which defines an inner periphery of the core path, and;

a splitter housing defining an outer periphery of the core path, a plurality of inlet stator vanes extending between said splitter housing and said inner core housing, and there being a

flow area between adjacent stator vanes, wherein a hydraulic diameter is defined as:

$$\text{Hydraulic diameter} = (4 \times A)/(O + L + I + L),$$

wherein A is the area between the trailing edge of one vane, the leading edge of an adjacent vane, the inner periphery of the splitter housing, and the outer periphery of the inner core housing, L is the length of the leading edge of each vane, O is the length of the inner periphery of the vanes and I is the length of the outer periphery between adjacent vanes, and wherein said hydraulic diameter is greater than or equal to about 1.5.

14. The gas turbine engine as set forth in claim 13, wherein said hydraulic diameter is greater than or equal to about 1.7.

15. The gas turbine engine as set forth in claim 14, wherein said gear reduction is positioned inwardly of said inner core housing.

16. The gas turbine engine as set forth in claim 15, wherein a bypass ratio of the amount of air delivered into said bypass duct compared to the amount of air delivered into said core path is greater than about 6.

17. The gas turbine engine as set forth in claim 16, wherein said bypass ratio is greater than 10.

18. The gas turbine engine as set forth in claim 17, wherein said gear reduction has a gear reduction ratio greater than 2.3.

19. The gas turbine engine as set forth in claim 13, wherein said low pressure turbine has a pressure ratio that is greater than about 5:1.

20. The gas turbine engine as set forth in claim 13, wherein said gear reduction has a gear

reduction ratio greater than 2.3.

21. A compressor module comprising:

a compressor rotor;

a plurality of inlet stator vanes adjacent the rotor; and

a flow area defined between leading edges of two adjacent stator vanes, and an outer boundary and an inner boundary, the hydraulic diameter being greater than or equal to about 1.5.

22. A module as set forth in claim 21, wherein said hydraulic diameter is greater than or equal to about 1.7.