WHAT IS CLAIMED IS:

1. A method for scheduling a foam cleaning of a gas turbine engine, comprising:

quantifying a range of improvement of an operational parameter within a family of gas turbine engines achievable by foam cleaning of a specific member of the family;

operating a specific gas turbine engine of the family;

measuring the operational parameter of the specific gas turbine engine during said operating;

determining that the specific gas turbine engine should be foam cleaned;

scheduling a foam cleaning of the specific gas turbine engine;

streaming foam into the specific gas turbine engine after said scheduling; and

rotating the specific gas turbine engine during said streaming.

2. The method of claim 1 which further comprises providing the measured operational parameter by telemetry to a data center.

3. The method of claim 2 wherein said scheduling a foam cleaning of the specific gas turbine engine is by the data center.

4. The method of claim 1 wherein the specific gas turbine engine has an owner and said determining is by the owner of the specific gas turbine engine.

5. The method of claim 1 wherein the specific gas turbine engine has an operator and said determining is by the operator of the specific gas turbine engine.

6. The method of claim 1 wherein the specific gas turbine engine has a start time and said measuring includes measuring the start time of the specific gas turbine engine and said determining is based on said measuring the start time.

7. The method of claim 1 wherein the specific gas turbine engine has a fuel consumption and said measuring includes measuring the fuel consumption of the specific gas turbine engine and said determining is based on said measuring the fuel consumption.

8. The method of claim 1 wherein the specific engine has a rotor speed and said measuring includes measuring the rotor speed of the specific gas turbine engine and said determining is based on said measuring the rotor speed.

9. The method of claim 1 wherein the specific gas turbine engine has an engine pressure ratio and said measuring includes measuring the engine pressure ratio of the specific gas turbine engine and said determining is based on said measuring the specific gas turbine engine pressure ratio.

10. The method of claim 1 wherein the specific gas turbine engine has a turbine temperature and said measuring includes measuring the turbine temperature of the specific gas turbine engine required to achieve a particular power output and said determining is based on said measuring the turbine temperature.

11. The method of claim 1 wherein the specific gas turbine engine has an operating speed and said measuring includes measuring the operating speed of the

specific gas turbine engine at cruise and said determining is based on said measuring the operating speed.

12. The method of claim 1 wherein the specific gas turbine engine has a time on wing and said measuring includes measuring the time on wing of the specific gas turbine engine and said determining is based on said measuring the time on wing.

13. The method of claim 1 wherein the measured operational parameter is provided by telemetry, and said scheduling is based on said determining.

14. The method of claim 1 which further comprises providing the measured operational parameter by telemetry, wherein said determining includes using the measured operational parameter provided by telemetry.

15. The method of claim 1 wherein said determining is at least partly based on carbon emissions of the specific gas turbine engine.

16. The method of claim 1 wherein said determining is at least partly based on oxides of nitrogen emissions of the specific gas turbine engine.

17. The method of claim 1 wherein said streaming the supply of foam is to a bleed air duct of the specific gas turbine engine.

18. The method of claim 1 wherein said streaming the supply of foam is to a manifold of tubing mounted to the specific gas turbine engine.

19. The method of claim 1 wherein the specific gas turbine engine has an air inlet and said streaming foam is into the air inlet.

20. The method of claim 1 wherein the specific gas turbine engine has a hot section and which further comprises cleaning the hot section by said streaming foam into the specific gas turbine engine.

21. The method of claim 1 wherein the specific gas turbine engine has a compressor and said streaming foam is into the compressor.

22. The method of claim 21 wherein the specific gas turbine engine has a hot section and which further comprises cleaning the hot section by said streaming foam into the compressor.

23. The method of claim 1 wherein said streaming is through a non-atomizing nozzle.

24. The method of any of the claims above wherein the specific gas turbine engine is installed on an aircraft and said operating is on the aircraft.

25. The method of any of the claims above wherein the specific gas turbine engine is installed in an engine test cell and said operating is in the engine test cell.

26. The method of claim 1 wherein the specific gas turbine engine includes an exhaust nozzle and which further comprises:

providing an effluent collector underneath the exhaust nozzle;

expelling the streamed foam from the exhaust nozzle; and

collecting the expelled foam in the effluent collector.

27. The method of claim 1 wherein the specific gas turbine engine is a multispool jet engine, and which further comprises:

rotating all spools of the specific gas turbine engine during said rotating the specific gas turbine engine;

permitting the innermost spool to come to a stop after said rotating;

rerotating all spools of the specific gas turbine engine after the innermost spool has stopped; and

restreaming a supply of foam into the specific gas turbine engine during said rerotating.

28. The method of claim 1 which further comprises collecting the streamed supply of foam that flows out of the specific gas turbine engine and post processing the collected foam.

29. The method of claim 1 wherein the specific gas turbine engine is a multispool jet engine including an inlet and one of the spools includes a compressor, and said streaming is first into the compressor.

30. The method of claim 1 wherein the specific gas turbine engine is a multispool jet engine including an inlet and one of the spools includes a compressor, and said streaming is first into the inlet.

31. A method for providing a foamed liquid cleaning agent to a gas turbine engine, comprising:

operating a gas turbine engine;

measuring an operational parameter of the gas turbine engine during said operating;

determining that the gas turbine engine should be foam washed based on the measured operational parameter;

operating a source of a liquid cleaning agent, a liquid pump, and a source of pressurized gas;

mixing pressurized gas with pressurized liquid cleaning agent and creating a supply of foam;

streaming the supply of foam into the gas turbine engine through a non-atomizing nozzle; and

rotating the gas turbine engine during said streaming.

32. The method of claim 31 which further comprises providing the measured operational parameter by telemetry to a data center.

33. The method of claim 31 wherein the gas turbine engine has an owner and said determining is by the owner of the gas turbine engine.

34. The method of claim 31 wherein the gas turbine engine has an operator and said determining is by the operator of the gas turbine engine.

35. The method of claim 31 wherein the gas turbine engine has a start time and said measuring includes measuring the start time of the gas turbine engine and said determining is based on said measuring.

36. The method of claim 31 wherein the gas turbine engine has a fuel consumption and said measuring includes measuring the fuel consumption of the gas turbine engine and said determining is based on said measuring.

37. The method of claim 31 wherein the gas turbine engine has a rotor speed and said measuring includes measuring the rotor speed of the gas turbine engine and said determining is based on said measuring.

38. The method of claim 31 wherein the gas turbine engine has an engine pressure ratio and said measuring includes measuring the engine pressure ratio of the gas turbine engine and said determining is based on said measuring.

39. The method of claim 31 wherein the gas turbine engine has a turbine temperature and said measuring includes measuring the turbine temperature of the gas turbine engine required to achieve a particular power output and said determining is based on said measuring.

40. The method of claim 31 wherein the gas turbine engine has an operating speed and said measuring includes measuring the operating speed of the gas turbine engine at cruise and said determining is based on said measuring.

41. The method of claim 31 wherein the gas turbine engine has a time on wing and said measuring includes measuring the time on wing of the gas turbine engine and said determining is based on said measuring.

42. The method of claim 31 wherein the measured operational parameter is provided by telemetry, and said scheduling is based on said determining.

43. The method of claim 31 wherein said determining is at least partly based on carbon emissions of the engine.

44. The method of claim 31 wherein said determining is at least partly based on oxides of nitrogen emissions of the engine.

45. The method of claim 31 wherein said streaming the supply of foam is to a bleed air duct of the gas turbine engine.

46. The method of claim 31 wherein said streaming the supply of foam is to a manifold of tubing mounted to the gas turbine engine.

47. The method of claim 31 wherein the gas turbine engine has an air inlet and said streaming foam is into the air inlet.

48. The method of claim 47 wherein the gas turbine engine has a hot section and which further comprises cleaning the hot section by said streaming foam into the air inlet.

49. The method of claim 31 wherein the gas turbine engine has a compressor and said streaming foam is into the compressor.

50. The method of claim 49 wherein the gas turbine engine has a hot section and which further comprises cleaning the hot section by said streaming the supply of foam into the compressor.

51. The method of any of the claims above wherein the gas turbine engine is installed on an aircraft and said operating is on the aircraft.

52. The method of any of the claims above wherein the gas turbine engine is installed in an engine test cell and said operating is in the engine test cell.

53. The method of claim 31 wherein the streamed supply of foam is at a velocity greater than about three feet per second and less than about fifteen feet per second.

54. The method of claim 31 wherein the streamed supply of foam is a unitary stream of substantially constant diameter.

55. The method of claim 31 wherein said mixing includes flowing the liquid cleaning agent in a first direction and injecting the pressurized gas in a second direction that has a velocity component at least partly opposite to the first direction.

56. The method of claim 31 wherein said operating includes a turbulence-reducing chamber and which further comprises reducing turbulence during said mixing.

57. The method of claim 31 which further comprise a mixing chamber, and wherein said mixing chamber includes a gas-pressurized plenum having a plurality of gasflow apertures and located within the mixing chamber, the mixing chamber being provided with a flow of the liquid cleaning agent, the apertures expelling gas into the flowing cleaning liquid to create the foam.

58. The method of claim 31 wherein said operating a source of liquid cleaning agent includes a mixing chamber and for creating the supply of foam and a cell growth chamber receiving the supply of created foam and which further comprises growing the size of the cells of the created foam within the cell growth chamber.

59. The method of claim 31 wherein said mixing includes creating a supply of a first foam, and which further comprises increasing the size of the cells of the first foam to form a second foam; and decreasing the size of the cells of the second foam to form a third foam, wherein said streaming the supply of foam is streaming a supply of the third foam.

60. The method of claim 31 wherein the gas turbine engine includes an exhaust nozzle and which further comprises:

providing an effluent collector underneath the exhaust nozzle;

expelling the streamed foam from the exhaust nozzle; and

collecting the expelled foam in the effluent collector.

61. The method of claim 31 wherein the gas turbine engine is a multispool jet engine, and which further comprises:

rotating all spools of the multispool jet engine during said rotating the multispool jet engine;

permitting the innermost spool to come to a stop after said rotating;

rerotating all spools of the multispool jet engine after the innermost spool has stopped; and

restreaming the supply of foam through the non-atomizing nozzle into the multispool jet engine during said rerotating.

62. The method of claim 31 which further comprises collecting the streamed supply of foam that flows out of the gas turbine engine and post processing the collected foam.

63. The method of claim 31 wherein the gas turbine engine is a multispool jet engine including an inlet and one of the spools includes a compressor, and said streaming is first into the compressor.

64. The method of claim 31 wherein the gas turbine engine is a multispool jet engine including an inlet and one of the spools includes a compressor, and said streaming is first into the inlet.

65. A method for providing a foamed liquid cleaning agent to a multispool jet engine, comprising:

operating a multispool jet engine;

measuring an operational parameter of the multispool jet engine during said operating;

determining that the multispool jet engine should be foam washed based on the measured operational parameter;

operating a source of a liquid cleaning agent, a liquid pump, and a source of pressurized gas;

mixing pressurized gas with pressurized liquid cleaning agent and creating a supply of foam; and

streaming the supply of foam into the multispool jet engine through a non-atomizing nozzle ;

rotating all spools of the multispool jet engine;

permitting the innermost spool to come to a stop after said rotating;

rerotating all spools of the multispool jet engine after the innermost spool has stopped; and

restreaming the supply of foam through the non-atomizing nozzle into the multispool jet engine during said rerotating.

66. The method of claim 65 wherein the multispool jet engine has a start time and said measuring includes measuring the start time of the multispool jet engine and said determining is based on said measuring.

67. The method of claim 65 wherein the multispool jet engine has a fuel consumption and said measuring includes measuring the fuel consumption of the multispool jet engine and said determining is based on said measuring.

68. The method of claim 65 wherein the multispool jet engine has a rotor speed and said measuring includes measuring the rotor speed of the multispool jet engine and said determining is based on said measuring.

69. The method of claim 65 wherein said measuring includes measuring the multispool jet engine pressure ratio of the multispool jet engine and said determining is based on said measuring.

70. The method of claim 65 wherein the multispool jet engine has a turbine temperature and said measuring includes measuring the turbine temperature of the

multispool jet engine required to achieve a particular power output and said determining is based on said measuring.

71. The method of claim 65 wherein the multispool jet engine has an operating speed and said measuring includes measuring the operating speed of the multispool jet engine at cruise and said determining is based on said measuring.

72. The method of claim 65 wherein the multispool jet engine has a time on wing and said measuring includes measuring the time on wing of the multispool jet engine and said determining is based on said measuring.

73. The method of claim 65 wherein said determining is at least partly based on carbon emissions of the multispool jet engine.

74. The method of claim 65 wherein said determining is at least partly based on oxides of nitrogen emissions of the multispool jet engine.

75. The method of claim 65 wherein said streaming the supply of foam is to a bleed air duct of the multispool jet engine.

76. The method of claim 65 wherein said streaming the supply of foam is to a manifold of tubing mounted to the multispool jet engine.

77. The method of claim 65 wherein the multispool jet engine has an air inlet, said streaming the supply of foam is into the air inlet, and which further comprises cleaning the hot section by said streaming the supply of foam into the air inlet.

78. The method of claim 65 wherein the multispool jet engine has a compressor, said streaming the supply of foam is into the compressor, and which further comprises cleaning the hot section by said streaming the supply of foam into the compressor.

79. The method of any of the claims above wherein the multispool jet engine is installed on an aircraft and said operating is on the aircraft.

80. The method of any of the claims above wherein the multispool jet engine is installed in an multispool jet engine test cell and said operating is in the multispool jet engine test cell.

81. The method of claim 65 wherein the streamed supply of foam is at a velocity greater than about three feet per second and less than about fifteen feet per second.

82. The method of claim 65 wherein the streamed supply of foam is a unitary stream of substantially constant diameter.

83. The method of claim 65 wherein said mixing includes flowing the liquid cleaning agent in a first direction and injecting the pressurized gas in a second direction that has a velocity component at least partly opposite to the first direction.

84. The method of claim 65 wherein said operating includes a turbulence-reducing chamber and which further comprises reducing turbulence during said mixing.

85. The method of claim 65 which further comprise a mixing chamber, and wherein said mixing chamber includes a gas-pressurized plenum having a plurality of gasflow apertures and located within the mixing chamber, the mixing chamber being provided with a flow of the liquid cleaning agent, the apertures expelling gas into the flowing cleaning liquid to create the foam.

86. The method of claim 65 wherein said operating a source of liquid cleaning agent includes a mixing chamber and for creating the supply of foam and a cell growth chamber receiving the supply of created foam and which further comprises growing the size of the cells of the created foam within the cell growth chamber.

87. The method of claim 65 wherein said mixing includes creating a supply of a first foam, and which further comprises increasing the size of the cells of the first foam to form a second foam; and decreasing the size of the cells of the second foam to form a third foam, wherein said streaming the supply of foam is streaming a supply of the third foam.

88. The method of claim 65 wherein the multispool jet engine includes an exhaust nozzle and which further comprises:

providing an effluent collector underneath the exhaust nozzle;

expelling the streamed foam from the exhaust nozzle; and

collecting the expelled foam in the effluent collector.

89. The method of claim 65 which further comprises collecting the streamed supply of foam that flows out of the multispool jet engine and post processing the collected foam.

90. The method of claim 65 wherein the multispool jet engine includes an inlet and one of the spools includes a compressor, and said streaming is directed first into the compressor.

91. The method of claim 65 wherein the multispool jet engine includes an inlet and one of the spools includes a compressor, and said streaming is directed first into the inlet.

92. A method for providing a foamed liquid cleaning agent to a gas turbine engine including an exhaust nozzle, comprising:

operating a gas turbine engine;

providing an effluent collector;

measuring an operational parameter of the gas turbine engine during said operating;

determining that the gas turbine engine should be foam washed based on the measured operational parameter;

operating a source of a liquid cleaning agent, a liquid pump, and a source of pressurized gas;

mixing pressurized gas with pressurized liquid cleaning agent and creating a supply of foam;

streaming the supply of foam into the gas turbine engine while rotating the gas turbine engine;

expelling the streamed foam from the exhaust nozzle;

collecting the expelled foam in the effluent collector; and

post processing the collected foam.

93. The method of claim 92 wherein the gas turbine engine has a start time and said measuring includes measuring the start time of the gas turbine engine and said determining is based on said measuring.

94. The method of claim 92 wherein the gas turbine engine has a fuel consumption and said measuring includes measuring the fuel consumption of the gas turbine engine and said determining is based on said measuring.

95. The method of claim 92 wherein the gas turbine engine has a rotor speed and said measuring includes measuring the rotor speed of the gas turbine engine and said determining is based on said measuring.

96. The method of claim 92 wherein the gas turbine engine has an engine pressure ratio and said measuring includes measuring the gas turbine engine pressure ratio of the gas turbine engine and said determining is based on said measuring.

97. The method of claim 92 wherein the gas turbine engine has a turbine temperature and said measuring includes measuring the turbine temperature of the gas turbine engine required to achieve a particular power output and said determining is based on said measuring.

98. The method of claim 92 wherein the gas turbine engine has an operating speed and said measuring includes measuring the operating speed of the gas turbine engine at cruise and said determining is based on said measuring.

99. The method of claim 92 wherein the gas turbine engine has a time on wing and said measuring includes measuring the time on wing of the gas turbine engine and said determining is based on said measuring.

100. The method of claim 92 wherein the measured operational parameter is provided by telemetry, and said scheduling is based on said determining.

101. The method of claim 92 wherein said determining is at least partly based on carbon emissions of the gas turbine engine.

102. The method of claim 92 wherein said determining is at least partly based on oxides of nitrogen emissions of the gas turbine engine.

103. The method of claim 92 wherein said streaming the supply of foam is to a bleed air duct of the gas turbine engine.

104. The method of claim 92 wherein said streaming the supply of foam is to a manifold of tubing mounted to the gas turbine engine.

105. The method of claim 92 wherein the gas turbine engine has an air inlet, said streaming the supply of foam is into the air inlet, and which further comprises cleaning the hot section by said streaming the supply of foam into the air inlet.

106. The method of claim 92 wherein the gas turbine engine has a compressor, said streaming the supply of foam is into the compressor, and which further comprises cleaning the hot section by said streaming the supply of foam into the compressor.

107. The method of any of the claims above wherein the gas turbine engine is installed on an aircraft and said operating is on the aircraft.

108. The method of any of the claims above wherein the gas turbine engine is installed in an engine test cell and said operating is in the engine test cell.

109. The method of claim 92 wherein the streamed supply of foam is at a velocity greater than about three feet per second and less than about fifteen feet per second.

110. The method of claim 92 wherein the streamed supply of foam is a unitary stream of substantially constant diameter.

111. The method of claim 92 wherein said mixing includes flowing the liquid cleaning agent in a first direction and injecting the pressurized gas in a second direction that has a velocity component at least partly opposite to the first direction.

112. The method of claim 92 wherein said operating includes a turbulence-reducing chamber and which further comprises reducing turbulence during said mixing.

113. The method of claim 92 which further comprise a mixing chamber, and wherein said mixing chamber includes a gas-pressurized plenum having a plurality of gasflow apertures and located within the mixing chamber, the mixing chamber being provided with a flow of the liquid cleaning agent, the apertures expelling gas into the flowing cleaning liquid to create the foam.

114. The method of claim 92 wherein said operating a source of liquid cleaning agent includes a mixing chamber and for creating the supply of foam and a cell growth chamber receiving the supply of created foam and which further comprises growing the size of the cells of the created foam within the cell growth chamber.

115. The method of claim 92 wherein said mixing includes creating a supply of a first foam, and which further comprises increasing the size of the cells of the first foam to form a second foam; and decreasing the size of the cells of the second foam to form a third foam, wherein said streaming the supply of foam is streaming a supply of the third foam.

116. The method of claim 92 wherein the gas turbine engine is a multispool jet engine including an inlet and one of the spools includes a compressor, and said streaming is first into the compressor.

117. The method of claim 92 wherein the gas turbine engine is a multispool jet engine including an inlet and one of the spools includes a compressor, and said streaming is first into the inlet.