CLAIMS

1. A method for in-situ cleaning one or more components of an aircraft-mounted gas turbine engine, the method comprising:

injecting a dry cleaning medium into the gas turbine engine at one or more locations, the dry cleaning medium comprising a plurality of abrasive microparticles; and

circulating, via motoring of the gas turbine engine, the cleaning medium through at least a portion of the gas turbine engine as mounted on an aircraft such that the abrasive microparticles abrade a surface of the one or more components so as to clean the surface.

2. The method of claim 1, wherein the plurality of abrasive microparticles comprises nut shells, fruit pit stones, alumina, silica, diamond, or a combination including any of the foregoing.

3. The method of claim 2, the plurality of abrasive microparticles comprising individual particle diameter sizes ranging from about 10 microns to about 100 microns.

4. The method of claim 1, wherein a first set of the plurality of abrasive microparticles comprises a median particle diameter equal to or less than 20 microns, and wherein a second set of the plurality of abrasive microparticles comprises a median particle diameter equal to or greater than 20 microns.

5. The method of claim 4, wherein the first set of abrasive microparticles comprises a median particle diameter equal to or less than 10 microns, and wherein the second set of abrasive microparticles comprises a median particle diameter equal to or greater than 40 microns.

6. The method of claim 1, wherein injecting the dry cleaning medium into the gas turbine engine further comprises injecting the cleaning medium into an inlet of the gas turbine engine, one or more ports of the gas turbine engine, one or more cooling passageways of the

gas turbine engine, an existing baffle plate system of the gas turbine engine, or a combination including any of the foregoing.

7. The method of claim 6, wherein circulating the cleaning medium through at least a portion of the gas turbine engine further comprises motoring the gas turbine engine during injection of the cleaning medium so as to provide airflow that circulates the plurality of abrasive microparticles through the gas turbine engine.

8. The method of claim 6, wherein circulating the cleaning medium through at least a portion of the gas turbine engine further comprises utilizing one or more external pressure sources to provide airflow that circulates the plurality of abrasive microparticles through the gas turbine engine.

9. The method of claim 1, further comprising creating a cleaning mixture comprising the plurality of abrasive microparticles and at least one of water or detergent.

10. The method of claim 9, further comprising circulating the cleaning mixture through at least a portion of the gas turbine engine via a pump.

11. The method of claim 1, wherein the one or more components of the gas turbine engine comprise at least one of a compressor, a high-pressure turbine, a low-pressure turbine, a combustion chamber, a nozzle, one or more blades, a booster, a casing of the gas turbine engine, turbine shrouds, or one or more cooling passageways of the gas turbine engine.

12. The method of claim 1, wherein the dry cleaning medium comprises silica.

13. The method of claim 1, wherein the plurality of abrasive microparticles comprises microparticles from at least one fruit pit stone.

14. The method of claim 13, wherein the plurality of abrasive microparticles comprises microparticles from at least one plum pit stone.

15. The method of claim 1, further comprising injecting the dry cleaning medium at a borescope port.

16. The method of claim 1, further comprising injecting the dry cleaning medium at a fuel nozzle flange.

17. A cleaning system for in-situ cleaning of one or more components of a gas turbine engine, the cleaning system comprising:

a dry cleaning medium comprising a plurality of abrasive microparticles, the plurality of abrasive microparticles comprising individual particle diameter sizes ranging from about 10 microns to about 100 microns; and

a delivery system configured to deliver the cleaning medium at one or more locations of the gas turbine engine circulating via motoring of the gas turbine engine so as to clean the one or more components thereof,

wherein the gas turbine engine is installed on an aircraft.

18. The cleaning system of claim 17, wherein the delivery system comprises one or more external pressure sources to provide airflow that circulates the plurality of abrasive microparticles through the gas turbine engine.

19. The cleaning system of claim 18, wherein the one or more external pressure sources comprise at least one of a fan, a blower, or a pump, and

wherein the one or more external pressure sources provide airflow at a pressure range between 5 psi and 1000 psi.

20. A method for in-situ cleaning one or more components of a gas turbine engine, the method comprising:

injecting a dry cleaning medium into the gas turbine engine at one or more locations, the dry cleaning medium comprising a plurality of abrasive microparticles; and

circulating, via motoring of the gas turbine engine, the cleaning medium

through at least a portion of the gas turbine engine such that the abrasive microparticles abrade a surface of the one or more components,

wherein the dry cleaning medium comprises alumina.