WHAT IS CLAIMED IS:

1. A vapor-based system for treating one or more components of a gas turbine engine, the system comprising:

a treatment compound heated to a delivery temperature for a corresponding delivery pressure, wherein the delivery temperature is greater than an engine component surface temperature, and wherein the treatment compound is a cleaning agent, a restorative agent, or a protective agent, wherein the treatment compound is a water-based compound;

a storage vessel containing the treatment compound, wherein the storage vessel is a pressure vessel holding a portion of the treatment compound as a vapor or wherein the storage vessel is a pressure vessel holding a portion of the treatment compound in a liquid state and is operably coupled to a vaporizer; and

a delivery module operably coupled to the storage vessel and to an engine access point, wherein the delivery module is operable to deliver the treatment compound at one or more locations of the gas turbine engine such that the treatment compound is a supersaturated vapor when delivered through an engine air-path so as to treat the engine component.

2. The vapor-based system of claim 1, wherein the delivery module further comprises:

a hose; and

a fuel system coupler operably coupling the delivery module to a fuel system, wherein the engine access point is a fuel injector nozzle.

3. The vapor-based system of claim 1, wherein the treatment compound is a protective compound.

4. The vapor-based system of claim 1, wherein the storage vessel is a first storage vessel, the vapor-based system further comprising:

a second storage vessel;

wherein the treatment compound further comprises a first active ingredient held in the first storage vessel and a second active ingredient held in the second storage vessel; and

wherein the delivery module further comprises a mixing chamber operably coupled to the first storage vessel and the second storage vessel.

5. The vapor-based system of claim 1, wherein the storage vessel is the pressure vessel holding a portion of the treatment compound as a vapor, the vapor-based system further comprising:

a pressure control mechanism coupled to the pressure vessel and a temperature control mechanism coupled to the pressure vessel.

6. The vapor-based system of claim 1, wherein the storage vessel is the pressure vessel holding the portion of the treatment compound in the liquid state and is operably coupled to the vaporizer, the vapor-based system further comprising:

a first pressure control mechanism coupled to the pressure vessel and a first temperature control mechanism coupled to the pressure vessel; and

wherein the vaporizer is further operably coupled to the delivery module, and wherein the vaporizer comprises a second temperature control mechanism and a second pressure control mechanism.

7. The vapor-based system of claim 1, wherein the storage vessel is the pressure vessel holding the portion of the treatment compound in the liquid state and is operably coupled to the vaporizer, and wherein the delivery module is a liquid delivery module, the vapor-based system further comprising:

a pressure control mechanism coupled to the pressure vessel and a temperature control mechanism coupled to the pressure vessel;

an engine air-path temperature, the engine air-path temperature being less than the delivery temperature; and

an engine air-path pressure, the engine air-path pressure being less than the delivery pressure.

8. The vapor-based system of claim 1, further comprising:

a discharge collector positioned to capture a vapor-based system waste fluid.

9. The vapor-based system of claim 1, wherein the delivery temperature is a compound deposition temperature, wherein the compound deposition temperature is the temperature at which a portion of the treatment compound changes phase and condenses on the engine component surface.

10. The vapor-based system of claim 1, wherein an engine component that is to be treated has an engine component surface temperature and wherein the system is configured so that

the delivery temperature of the supersaturated vapor is greater than the engine component surface temperature.

11. The vapor-based system of claim 10, wherein the delivery module is operable to deliver the treatment compound to the engine component such that the supersaturated vapor changes phase on a surface of the engine component.

12. A method for treating one or more components of an aircraft-mounted gas turbine engine, the method comprising:

operably coupling a delivery module to an engine access point, wherein the delivery module is coupled to a storage vessel, wherein the storage vessel contains the treatment compound, wherein the storage vessel is a pressure vessel holding a portion of the treatment compound as a vapor or wherein the storage vessel is a pressure vessel holding a portion of the treatment compound in a liquid state and is operably coupled to a vaporizer, and wherein the treatment compound is a cleaning agent, a restorative agent, or a protective agent, wherein the treatment compound is a water-based compound;

activating the delivery module to deliver a portion of the treatment compound to the engine access point, wherein the treatment compound is a supersaturated vapor when delivered through an engine air-path, the supersaturated vapor heated to a delivery temperature for a corresponding delivery pressure, wherein the delivery temperature is greater than a surface temperature of a component surface such that the vapor changes phase on the component surface.

13. The method of claim 12, further comprising:

circulating, via motoring of the gas turbine engine, the treatment compound through at least a portion of the gas turbine engine as mounted on the aircraft such that the treatment compound contacts a surface of the one or more components.

14. The method of claim 12, wherein the engine access point is a fuel system, an engine exhaust nozzle, or an inlet of a fan section.

15. The method of claim 12, wherein the storage vessel is a first storage vessel and the treatment compound is a first active ingredient, the method for treatment further comprising:

introducing a second active ingredient of the treatment compound held in a second storage vessel;

producing the treatment compound by mixing the first active ingredient with the second active ingredient in a mixing chamber operably coupled to the delivery module; and

delivering a portion of the mixed treatment compound to the delivery module.

16. The method of claim 12, wherein the storage vessel is the pressure vessel holding the portion of the treatment compound in the vapor state, the method for treatment further comprising:

maintaining a pressure with a pressure control mechanism coupled to the pressure vessel;

maintaining a temperature with a temperature control mechanism coupled to the pressure vessel;

wherein holding the portion of the treatment compound in the vapor state comprises

holding the portion of the treatment compound in the vapor state in the pressure vessel with at least one of the pressure control mechanism and the temperature control mechanism; and

delivering the portion of the treatment compound in vapor form to the engine air-path.

17. The method of claim 12, wherein the storage vessel is the pressure vessel holding the portion of the treatment compound in the liquid state and is operably coupled to the vaporizer, the method for treatment further comprising:

maintaining a first pressure with a pressure control mechanism coupled to the pressure vessel;

maintaining a first temperature with a temperature control mechanism coupled to the pressure vessel;

holding the treatment compound in the liquid state in the pressure vessel with at least one of the pressure control mechanism and the temperature control mechanism.

18. The method of claim 17, wherein the delivery module further comprises:

a hose, a fuel system coupler operably coupling the delivery module to a fuel system, and wherein the engine access point is a fuel injector nozzle.

19. The method of claim 12, wherein the storage vessel is the pressure vessel holding the portion of the treatment compound in the liquid state and is operably coupled to the vaporizer, the method for treatment further comprising:

maintaining a first pressure with a first pressure control mechanism coupled to the pressure vessel;

maintaining a first temperature with a first temperature control mechanism coupled to the pressure vessel;

holding the portion of the treatment compound in a liquid state in the pressure vessel with at least one of the first pressure control mechanism and the first temperature control mechanism;

the vaporizer comprising a second temperature control mechanism and a second pressure control mechanism;

establishing a vaporization condition within the vaporizer with at least one of the second pressure control mechanism and the second temperature control mechanism;

vaporizing a portion of the treatment compound in the vaporizer; and

delivering the treatment compound to the delivery module.