WHAT IS CLAIMED IS:

1. A control system comprising:

one or more controllers configured to determine when to extend a life span of a coating of an engine by applying an additive to the coating based on one or more monitored parameters of the engine, the monitored parameters including one or more of a condition of the coating, an operational parameter of the engine, a comparison between an engine output and a designated output, or an environmental condition;

at least one processor; and

memory operatively coupled to the at least one processor, the memory comprising a restoration history database and a coating restoration parameters database,

wherein the restoration history database comprises a coating restoration type and a date that a previous coating restoration was performed on the engine,

wherein the one or more controllers also are configured to direct application of the additive onto the coating of the engine based on the monitored parameters of the engine.

2. The control system of claim 1

wherein the coating restoration parameters database comprises information relating to at least one available coating restoration regimen, and

wherein the coating is a thermal barrier coating.

3. The control system of claim 1 further comprising:

at least one sensor operatively coupled to the one or more controllers,

wherein the monitored parameters include a presence of spalling in the coating as the condition of the coating.

4. The control system of claim 3 wherein the monitored parameters include one or more of an engine fuel flow, a compressor exit pressure, or a compressor exit temperature as the operational parameter of the combustor of the engine, and

wherein the at least one sensor comprises at least one coating temperature sensor.

5. The control system of claim 2 further comprising:

at least one sensor operatively coupled to the one or more controllers,

wherein the at least one sensor transmits real time measurements to the memory and the at least one processor, and

wherein the monitored parameters include one or more of an exhaust temperature, derating of the engine, engine overdriving, engine speed, a number of operational cycles of the engine.

6. The control system of claim 3, the at least one sensor further comprising:

a first sensor, the first sensor positioned to measure an air temperature at an engine inlet; and

a second sensor, the second sensor positioned to measure an air temperature at an engine exhaust,

wherein the monitored parameters include at least one of a presence of dust detected in the operating environment of the engine and an amount of dust detected in the operating environment of the engine.

7. The control system of claim 1 wherein the operational parameter of the engine includes an operational parameter of one or more of a combustor, a turbine shroud, and a combustor fuel nozzle of the engine, and

wherein the engine comprises a multi-shaft turbofan gas turbine engine.

8. The control system of claim 1 wherein the one or more controllers are configured to determine when to extend the life span of the coating by determining a number of operational cycles that the engine performs before the additive is applied to the coating.

9. The control system of claim 1 wherein the one or more controllers are configured to determine when to extend the life span of the coating by determining a trigger point in time at which the additive is to be applied to the coating.

10. The control system of claim 1 wherein the one or more controllers are configured to determine when to extend the life span of the coating by determining a maintenance date by which the additive is to be applied to the coating.

11. The control system of claim 1 wherein the one or more controllers are configured to determine a residual useful life span of the coating based on the monitored parameters and to communicate the residual useful life span to an operator.

12. The control system of claim 1 wherein the engine is a turbine engine of an aircraft, wherein the engine comprises:

a turboprop engine; and

a variable pitch propeller.

13. The control system of claim 1 wherein the one or more controllers are configured to determine an amount of additive to apply onto the coating based on the monitored parameters.

14. The control system of claim 1 wherein the one or more controllers are configured to determine a type of additive to apply onto the coating based on the monitored parameters.

15. A method comprising:

monitoring parameters of an engine having a coating, the parameters including one or more of a condition of the coating, an operational parameter of a combustor of the engine, a comparison between an engine output and a designated output, or an environmental condition to which the engine is exposed during operation;

determining when to extend a life span of the coating of the engine by applying an additive to the coating based on one or more of the parameters of the engine that are monitored, and

directing, by one or more controllers, an application of the additive onto the coating of the engine based on the monitored parameters of the engine, wherein directing, by one or more controllers further comprises providing a coating restoration unit, wherein the coating restoration unit comprises the one or more controllers, the coating restoration unit further comprising:

at least one rail;

at least one glider coupled to the at least one rail;

at least one mechanism attached to the glider; and

at least one spray nozzle attached to the at least one mechanism, the at least one spray nozzle operatively coupled to the one or more controllers,

wherein the at least one rail and the at least one glider provide 360° degree movement of the at least one spray nozzle for applying the additive to any surface of the coating of the engine.

16. The method of claim 15 further comprising directing application of the additive onto the coating of the engine based on the parameters of the engine that are monitored.

17. The method of claim 16,

wherein the coating is a thermal barrier coating.

18. The method of claim 17 wherein the monitored parameters include a presence of spalling in the coating as the condition of the coating, and

wherein the coating restoration unit increases the amount of the additive applied to the coating of the engine compared to an amount of additive applied to the coating assuming an earlier date of maintenance.

19. The method of claim 17 wherein the monitored parameters include one or more of an engine fuel flow, a compressor exit pressure, or a compressor exit temperature as the operational parameter of the combustor of the engine,

wherein the at least one spray nozzle receives a slurry and air for outputting the additive onto the coating.

20. The method of claim 15 wherein the monitored parameters include one or more of derating of the engine, engine overdriving, engine speed, or auxiliary power use of electric current generated based on movement of the engine as the comparison between the engine output and the designated output, and

wherein determining when to extend a life span of the coating of the engine further comprises determining when to extend a life span of the coating of the engine based at least partially on data of the engine in a test cell.

21. The method of claim 15 wherein the monitored parameters include one or more of a presence or an amount of dust.

22. The method of claim 15 wherein determining when to extend the life span of the coating includes determining one or more of:

a trigger point in time at which the additive is to be applied to the coating, and

a maintenance date by which the additive is to be applied to the coating.

23. A control system comprising:

one or more controllers configured to monitor one or more parameters of an engine having a thermal barrier coating, the one or more parameters including one or more of a presence of spalling in the coating as the condition of the coating, an engine fuel flow, a compressor exit pressure, a compressor exit temperature, an exhaust temperature, derating of the engine, engine overdriving, engine speed, a number of operational cycles of the engine, auxiliary power use of electric current generated based on movement of the engine, a presence of dust in an environment where the engine operates, or an ambient temperature of the environment where the engine operates,

at least one processor; and

memory operatively coupled to the at least one processor, the memory comprising a restoration history database and a coating restoration parameters database,

wherein the restoration history database comprises a date that a previous coating restoration was performed on the engine,

wherein the coating restoration parameters database comprises information relating to at least one available coating restoration regimen, and

wherein the coating is a thermal barrier coating,

wherein the one or more controllers also are configured to direct application of an additive onto the coating of the engine based on the one or more parameters of the engine that are monitored.

24. The control system of claim 23 further comprising a coating restoration system the coating restoration unit further comprising:

at least one rail;

at least one glider coupled to the at least one rail;

at least one mechanism attached to the glider; and

at least one spray nozzle attached to the at least one mechanism, the at least one spray nozzle operatively coupled to the one or more controllers,

wherein the coating restoration system is mounted to a transport vehicle.