WHAT IS CLAIMED IS:

1. A modular foam cart for washing a gas turbine engine, the modular foam cart comprising:

a detergent reservoir for storing wash fluid;

a pump configured for receiving a flow of wash fluid and pressurizing the flow of wash fluid;

a foam generating device in fluid communication with the pump, the foam generating device being configured for aerating the flow of wash fluid to generate a flow of foamed wash fluid;

a distribution manifold positioned within the modular cart and being in fluid communication with the foam generating device, the distribution manifold being configured for selectively directing the flow of foamed wash fluid through a plurality of wash lines;

a plurality of valves, each of the plurality fluidly connecting a respective one of the plurality of wash lines to the pump, wherein each of the plurality of valves is an independently controllable variable throughput valve, wherein each variable throughput valve is a valve that can be positioned at a fully closed position that corresponds to a flow rate of zero, fully open position that corresponds to a maximum flow rate, or any of a number of intermediary positions that each correspond to a flow rate that is greater than zero but less than the maximum flow rate; and

a programmed controller in operative communication with the foam generating device and the plurality of valves wherein the controller is configured to:

determine one or more operating characteristics of the gas turbine engine;

automatically determine a set of wash cycle parameters based at least in part on the one or more operating characteristics of the gas turbine engine;

selectively provide the flow of wash fluid to the distribution manifold; and

selectively regulate the plurality of valves to provide a portion of the flow of wash fluid to at least two of the plurality of wash lines, wherein the plurality of valves are independently regulated to provide different flow rates according to the determined set of wash cycle parameters.

2. The modular foam cart of claim 1, wherein the set of wash cycle parameters includes a density of the flow of foamed wash fluid.

3. The modular foam cart of claim 1, wherein the set of wash cycle parameters includes a temperature or a flow rate of either the flow of wash fluid or a flow of air into the foam generating device.

4. The modular foam cart of claim 1, further comprising a foam quality sensor positioned within the flow of foamed wash fluid proximate the distribution manifold.

5. The modular foam cart of claim 1, wherein the gas turbine engine comprises a plurality of borescope holes and the plurality of wash lines provide fluid communication between the distribution manifold and the plurality of borescope holes for selectively providing a portion of the flow of foamed wash fluid to the gas turbine engine.

6. The modular foam cart of claim 1, wherein each of the plurality of valves are operable independent of one another to simultaneously provide a first flow of foam through a first wash line according to a first spray schedule and a second flow of foam through a second wash line according to a second spray schedule, wherein the first spray schedule is different than the second spray schedule.

7. The modular foam cart of claim 6, wherein the first spray schedule includes at least one of a magnitude, a velocity, a pressure, a temperature, a spray duration, or a time delay associated with the application of the first flow of foam, and wherein the second spray schedule includes at least one of a magnitude, a velocity, a pressure of, a temperature, a spray duration, or a time delay associated with the application of the second flow of foam.

8. The modular foam cart of claim 1, wherein the one or more operating characteristics of the gas turbine engine comprise a model number of the gas turbine engine, a cleaning history of the gas turbine engine, and a flight history of the gas turbine engine, including a flight environment, contaminant exposure, flight altitude, and engine speeds.

9. A wash system for washing a gas turbine engine, the gas turbine engine comprising a compressor section, a combustor section, and a turbine section, the turbine engine defining a plurality of borescope holes located within one or more of the compressor section, the combustor section, and the turbine section, the gas turbine engine further comprising one or more inlet nozzles positioned proximate an engine inlet, the wash system comprising:

a detergent reservoir for storing wash fluid;

a distribution manifold providing selective fluid communication between the detergent reservoir and a plurality of wash lines fluidly coupled to the plurality of borescope holes and the inlet nozzles;

a pump configured for urging a flow of wash fluid from the detergent reservoir through the distribution manifold and at least one of the plurality of wash lines;

a foam generating device in fluid communication with the pump, the foam generating device being configured for aerating the flow of wash fluid to generate a flow of foamed wash fluid;

a plurality of valves, each of the plurality of valves fluidly connecting a respective one of the plurality of wash lines to the pump, wherein each of the plurality of valves is an independently controllable variable throughput valve, and wherein each variable throughput valve is a valve that can be positioned at a fully closed position that corresponds to a flow rate of zero, a fully open position that corresponds to a maximum flow rate, or any of a number of intermediary positions that each correspond to a flow rate that is greater than zero but less than the maximum flow rate; and

a programmed controller in operative communication with the distribution manifold and the plurality of valves, the controller being configured to:

determine one or more operating characteristics of the gas turbine engine;

automatically determine a set of wash cycle parameters based at least in part on the one or more operating characteristics of the gas turbine engine, wherein the set of wash cycle parameters includes one or more foam quality characteristics of the flow of foamed wash fluid; selectively provide the flow of wash fluid to the distribution manifold; and

selectively regulate the plurality of valves to provide a portion of the flow of wash fluid to at least two of the plurality of wash lines, wherein the plurality of valves are independently regulated to provide different flow rates according to the determined set of wash cycle parameters.

10. The wash system of claim 9, wherein the set of wash cycle parameters includes at least one of a magnitude, a velocity, a pressure, a temperature, a spray duration, or a time delay associated with the application of the flow of foamed wash fluid.

11. The wash system of claim 9, wherein the one or more operating characteristics of the gas turbine engine comprise a model number of the gas turbine engine, a cleaning history of

the gas turbine engine, and a flight history of the gas turbine engine, including a flight environment, contaminant exposure, flight altitude, and engine speeds.

12. The modular foam cart of claim 1, further comprising a collection module comprising:

an apron positioned proximate the gas turbine engine for collecting used wash fluid;

a scavenge pump fluidly coupled to the apron for urging a flow of used wash fluid; and

one or more filters for removing contaminants from the flow of used wash fluid.

13. The modular foam cart of claim 12, wherein the flow of used wash fluid is recirculated through the gas turbine engine or passed back into the detergent reservoir for future reuse.

14. The modular foam cart of claim 12, wherein the collection module comprises:

one or more waste containers; and

a bypass line providing fluid communication between the one or more filters and the one or more waste containers, wherein the flow of used wash fluid is directed to the one or more waste containers.

15. The modular foam cart of claim 1, comprising:

a plurality of flow meters, each of the plurality of flow meters being operably coupled to a respective one of the plurality of wash lines and the controller, the controller being configured for regulating the plurality of valves based on feedback from the plurality of flow meters.