CLAIMS

1. A cargo-neutral climate control diagnostic system for a climate controlled mobile cargo container comprising:

a controller configured and disposed to be connected to one or more climate control components, the controller being configured and disposed to identify a cargo-neutral test opportunity and conduct a test to determine an operational state of the one or more climate control components of the climate controlled mobile cargo container while maintaining selected environmental conditions,

wherein the cargo-neutral test opportunity includes a transition from a first operating mode to a second operating mode.

2. The cargo-neutral climate control diagnostic system according to claim 1, wherein the first operating mode includes one of a system start-up mode, a cooling mode, a fan speed mode, and a defrost mode.

3. The cargo-neutral climate control diagnostic system according to claim 2, wherein the second operating mode includes another of the cooling mode, the fan speed mode, and the defrost mode.

4. The cargo-neutral climate control diagnostic system according to claim 1, wherein the test includes at least one of an electrical response test, a sensor response test, a multiple sensor correlation test, a system/environment correlation test, and a refrigerant flow test.

5. A climate controlled mobile cargo container comprising:

a container body including an outer surface and an interior storage compartment;

a climate control system operatively connected to condition the interior storage compartment, the climate control system including a plurality of climate control components; and

a cargo-neutral climate control diagnostic system comprising:

a controller connected to one or more of the climate control components, the controller being configured and disposed to identify a cargo-neutral test opportunity and conduct a test to determine an operational state of the one or more climate control components of the climate controlled mobile cargo container while maintaining selected environmental conditions,

wherein the cargo-neutral test opportunity includes a transition from a first operating mode to a second operating mode.

6. The climate controlled mobile cargo container according to claim 5, wherein

the first operating mode includes one of a system start-up mode, a cooling mode, a fan speed mode, and a defrost mode.

7. The climate controlled mobile cargo container according to claim 6, wherein the second operating mode includes another of the cooling mode, the fan speed mode, and the defrost mode.

8. The climate controlled mobile cargo container according to claim 5, wherein the test includes at least one of an electrical response test, a sensor response test, a multiple sensor correlation test, a system/environment correlation test, and a refrigerant flow test.

9. A method of conducting a cargo-neutral diagnostic test of a climate controlled mobile cargo container, the method comprising:

detecting a cargo-neutral testing opportunity having a cargo-neutral test period, by *inter alia* determining a first operating mode, a second operating mode and a transition from the first operating mode to the second operating mode; and

running a diagnostic test of one or more climate control components of the climate controlled mobile cargo container during the cargo neutral test period.

10. The method of claim 9, wherein determining the first operating mode includes sensing a current operating mode and determining the second operating mode includes predicting a future operating mode.

11. The method of claim 9, wherein determining the first operating mode includes sensing one of a system start-up mode, a cooling mode, a fan speed mode, and a defrost mode.

12. The method of claim 11, wherein determining the second operating mode includes predicting another of the cooling mode, the fan speed mode, and the defrost mode.

13. The method of claim 9, wherein running the diagnostic test includes running at least one of an electrical response test, a sensor response test, a multiple sensor correlation test, a system/environment correlation test, and a refrigerant flow test.

14. The method of claim 9, wherein running the diagnostic test includes running a diagnostic of one or more active climate control components.

15. The method of claim 14, wherein running the diagnostic test includes selecting a cargo-neutral diagnostic test of at least one of the one or more climate control components.

16. The method of claim 9, wherein selecting the cargo-neutral diagnostic test includes selecting a cargo-neutral diagnostic test sequence of the cargo-neutral diagnostic test.

17. The method of claim 9, wherein running the diagnostic test of one or more

climate control components includes implementing a passive diagnostic test of the one or more climate control components.