CLAIMS

What is claimed is:

1. A gas turbine engine, comprising:

a heat exchanger that exchanges heat with a bleed airflow to provide a conditioned airflow;

a diffuser case having a plenum that receives said conditioned airflow;

a passageway fluidly connected between said heat exchanger and said diffuser case, wherein said conditioned airflow is communicated through said passageway and into said plenum; and

a nozzle assembly in fluid communication with said plenum of said diffuser case to receive said conditioned airflow from said plenum.

2. The gas turbine engine as recited in claim 1, wherein said nozzle assembly is a tangential onboard injection (TOBI) nozzle.

3. The gas turbine engine as recited in claim 1, comprising a rotor assembly downstream from said nozzle assembly, wherein said rotor assembly is conditioned by said conditioned airflow from said nozzle assembly.

4. The gas turbine engine as recited in claim 3, wherein said rotor assembly is a component of a turbine section of the gas turbine engine.

5. The gas turbine engine as recited in claim 1, wherein said passageway includes tubing.

6. The gas turbine engine as recited in claim 1, wherein said bleed airflow is communicated from a compressor section of the gas turbine engine.

7. The gas turbine engine as recited in claim 1, wherein said heat exchanger exchanges heat between said bleed airflow and a fan airflow to render said conditioned airflow.

8. The gas turbine engine as recited in claim 1, wherein said diffuser case includes an outer wall and an inner wall and said plenum extends between said outer wall and said inner wall.

9. The gas turbine engine as recited in claim 1, wherein said plenum includes a plurality of castellations circumferentially disposed about said plenum.

10. The gas turbine engine as recited in claim 9, wherein said plurality of castellations divide said plenum into a plurality of passages.

11. The gas turbine engine as recited in claim 1, wherein said diffuser case extends radially inwardly from a combustor of the gas turbine engine and divides an interior of a portion of the gas turbine engine into an outer cavity and an inner cavity.

12. The gas turbine engine as recited in claim 11, wherein the gas turbine engine excludes a bearing compartment at a radially inward position from said combustor.

13. A method of conditioning a portion of a gas turbine engine, comprising:

removing heat from a bleed airflow to render a conditioned airflow;

communicating the conditioned airflow through a plenum of a diffuser case; and

feeding the conditioned airflow through a nozzle assembly to a downstream location of the gas turbine engine.

14. The method as recited in claim 13, comprising the step of cooling a rotor assembly of the gas turbine engine with the conditioned airflow.

15. The method as recited in claim 13, wherein the step of communicating the conditioned airflow includes:

communicating the conditioned airflow along a formed plenum path that extends from a heat exchanger, through a passageway, then through the plenum, and then through the nozzle assembly.

16. A gas turbine engine, comprising:

a compressor section;

a turbine section downstream from said compressor section;

a combustor section positioned between said compressor section and said turbine section; and

a cooled cooling air system that includes a heat exchanger, a diffuser case having a plenum that axially extends radially inwardly from said combustor section, and a nozzle assembly, wherein said cooled cooling air system establishes a formed plenum path that extends from said heat exchanger, through said plenum and then through said nozzle assembly to condition hardware of said turbine section.

CLAIMS

What is claimed is:

1. A gas turbine engine, comprising:

a heat exchanger that exchanges heat with a bleed airflow to provide a conditioned airflow;

a diffuser case having a plenum that receives said conditioned airflow, said diffuser case including an outer circumferential wall and an inner circumferential wall that is circumscribed by said outer circumferential wall, and said plenum extends radially from said outer circumferential wall to said inner circumferential wall;

a passageway fluidly connected between said heat exchanger and said diffuser case, wherein said conditioned airflow is communicated through said passageway and into said plenum; and

a nozzle assembly in fluid communication with said plenum of said diffuser case to receive said conditioned airflow from said plenum.

2. The gas turbine engine as recited in claim 1, wherein said nozzle assembly is a tangential onboard injection (TOBI) nozzle.

3. The gas turbine engine as recited in claim 1, comprising a rotor assembly downstream from said nozzle assembly, wherein said rotor assembly is conditioned by said conditioned airflow from said nozzle assembly.

4. The gas turbine engine as recited in claim 3, wherein said rotor assembly is a component of a turbine section of the gas turbine engine.

5. The gas turbine engine as recited in claim 1, wherein said passageway includes tubing.

6. The gas turbine engine as recited in claim 1, wherein said bleed airflow is communicated from a compressor section of the gas turbine engine.

7. The gas turbine engine as recited in claim 1, wherein said heat exchanger exchanges heat between said bleed airflow and a fan airflow to render said conditioned airflow.

8. The gas turbine engine as recited in claim 1, wherein said plenum includes a plurality of castellations circumferentially disposed about said plenum.

9. The gas turbine engine as recited in claim 8, wherein said plurality of castellations divide said plenum into a plurality of passages.

10. The gas turbine engine as recited in claim 1, wherein said diffuser case extends radially inwardly from a combustor of the gas turbine engine and divides an interior of a portion of the gas turbine engine into an outer cavity and an inner cavity.

11. The gas turbine engine as recited in claim 10, wherein the gas turbine engine excludes a bearing compartment at a radially inward position from said combustor.

12. A method of conditioning a portion of a gas turbine engine, comprising:

removing heat from a bleed airflow to render a conditioned airflow;

communicating the conditioned airflow through a plenum of a diffuser case, the diffuser case including an outer circumferential wall and an inner circumferential wall that is circumscribed by the outer circumferential wall, and the plenum extends radially from the outer circumferential wall to the inner circumferential; and

feeding the conditioned airflow through a nozzle assembly to a downstream location of the gas turbine engine.

13. The method as recited in claim 12, comprising the step of cooling a rotor assembly of the gas turbine engine with the conditioned airflow.

14. The method as recited in claim 12, wherein the step of communicating the conditioned airflow includes:

communicating the conditioned airflow along a formed plenum path that extends from a heat exchanger, through a passageway, then through the plenum, and then through the nozzle assembly.

15. A gas turbine engine, comprising:

a compressor section;

a turbine section downstream from said compressor section;

a combustor section positioned between said compressor section and said turbine section; and

a cooled cooling air system that includes a heat exchanger, a diffuser case, and a nozzle assembly, said diffuser case including an outer circumferential wall and an inner circumferential wall that is circumscribed by said outer circumferential wall, and a plenum is disposed inside said diffuser case and extends radially from said outer circumferential wall to said inner circumferential wall, and wherein said cooled cooling air system establishes a formed plenum path that extends from said heat exchanger, through said plenum and then through said nozzle assembly to condition hardware of said turbine section.