CLAIMS

WHAT IS CLAIMED IS:

1. A maintenance tool configured for performing maintenance operations within a gas turbine engine, the gas turbine engine defining a core air flowpath and a plurality of inspection holes spaced circumferentially about the gas turbine engine, the maintenance tool comprising:

a rail system comprising a plurality of rail segments, the plurality of rail segments configured to be inserted through an individual inspection hole of the plurality of inspection holes of the gas turbine engine for assembly of the rail system within the core air flowpath, wherein each of the plurality of rail segments extends lengthwise between a first end and a second end and is connected to an adjacent rail segment of the plurality of rail segments at one of the first end or the second end;

a maintenance head slidable along the plurality of rail segments of the rail system for performing maintenance operations within the core air flowpath, the maintenance head slidably coupled to an exterior of the plurality of rail segments of the rail system; and

a plurality of radial clamps fixed to the rail system at circumferentially spaced locations, the plurality of radial clamps configured to extend through respective holes of the plurality of inspection holes while fixed to the rail system.

2. The maintenance tool of claim 1, wherein each of the plurality of rail segments is pivotably connected to the adjacent rail segment.

3. The maintenance tool of claim 1, wherein the plurality of rail segments extend generally along a circumferential direction of the gas turbine engine when assembled within the core air flowpath of the gas turbine engine.

4. The maintenance tool of claim 1, wherein the plurality of radial clamps each include a shaft.

5. The maintenance tool of claim 4, wherein the plurality of radial clamps each include a pair of attachment pins.

6. The maintenance tool of claim 4, wherein the plurality of radial clamps each include a body portion.

7. The maintenance tool of claim 1, wherein the gas turbine engine comprises a combustion chamber, and wherein the plurality of rail segments are configured for assembly within the combustion chamber of the gas turbine engine.

8. The maintenance tool of claim 1, further comprising:

an actuation device operable with the maintenance head to move the maintenance head along the plurality of rail segments of the rail system.

9. The maintenance tool of claim 8, wherein the actuation device is configured as a pulley system, wherein the pulley system includes a first line and a second line, wherein the first line and the second line are each attached to the maintenance head.

10. The maintenance tool of claim 9, wherein the plurality of rail segments of the rail system extend three hundred and sixty degrees (360°) within the core air flowpath when assembled within the core air flowpath, wherein the rail system defines an opening for the first and second lines of the pulley system, wherein the first line extends from the opening and through the plurality of rail segments to the maintenance head in a first circumferential direction, and wherein the second line extends from the opening and through the plurality of rail segments to the maintenance head in a second circumferential direction.

11. The maintenance tool of claim 9, wherein the pulley system further includes a first tensioner operable with the first line and a second tensioner operable with the second line.

12. The maintenance tool of claim 1, wherein the maintenance head comprises one or more cameras.

13. The maintenance tool of claim 12, wherein the maintenance head further comprises one or more light sources.

14. The maintenance tool of claim 1, wherein the rail system extends three hundred and sixty degrees (360°) within the core air flowpath when assembled within the core air flowpath.

15. The maintenance tool of claim 1, wherein each of the plurality of rail segments defines a groove opening to an external surface of the respective rail segment, and wherein the maintenance head is movable along the grooves of each of the plurality of rail segments.

16. A gas turbine engine system comprising:

a gas turbine engine having a compressor section, a combustion section, and a turbine section in serial flow order and together defining at least in part a core air flowpath, the gas turbine engine defining a plurality of inspection holes spaced circumferentially about the gas turbine engine; and

a maintenance tool comprising:

a rail system comprising a plurality of rail segments, the plurality of rail segments configured to be inserted through an individual inspection hole of the plurality of inspection holes of the gas turbine engine for assembly within the core air flowpath, wherein each of the plurality of rail segments extends lengthwise between a first end and a second end and is connected to an adjacent rail segment of the plurality of rail segments at one of the first end or second end;

a plurality of radial clamps fixed to a rail system at circumferentially spaced locations, the plurality of radial clamps extending through respective holes of the plurality of inspection holes while fixed to the rail system; and

a maintenance head positioned within the core air flowpath and slidable along the plurality of rail segments of the rail system for performing maintenance operations within the core air flowpath,

wherein the maintenance head is slidably coupled to an exterior of the plurality of rail segments of the rail system.

17. The gas turbine engine system of claim 16, wherein each of the plurality of rail segments is pivotably connected to the adjacent rail segment.

18. The gas turbine engine system of claim 16, wherein the plurality of radial clamps are attached to the rail system within the core air flowpath of the gas turbine engine.

19. The gas turbine engine system of claim 16, wherein the plurality of rail segments extend generally along a circumferential direction of the gas turbine engine.

20. The gas turbine engine system of claim 16, wherein the combustion section of the gas turbine engine comprises a combustion chamber, and wherein the plurality of rail segments are assembled within a section of the core air flowpath extending through the combustion chamber of the gas turbine engine.

21. The gas turbine engine of claim 16, wherein the rail system extends three hundred and sixty degrees (360°) within the core air flowpath.

22. The maintenance tool of claim 1, wherein each of the plurality of rail segments is connected to a forward-adjacent rail segment of the plurality of rail segments at one of the first end or the second end and is connected to an aft-adjacent rail segment of the plurality of rail segments at the other of the first end or the second end.

23. A maintenance tool for a gas turbine engine defining a core air flowpath and a plurality of inspection holes, the maintenance tool comprising:

a rail system comprising a plurality of rail segments insertable through one or more of the inspection holes of the gas turbine engine for assembly within the core air flowpath, wherein each of the plurality of rail segments extends lengthwise between a first end and a second end and is connected to an adjacent rail segment of the plurality of rail segments at one of the first end or the second end; and

a maintenance head slidable along the plurality of rail segments of the rail system for performing maintenance operations within the core air flowpath, the maintenance head slidably coupled to an exterior of the plurality of rail segments of the rail system;

an actuation device operable with the maintenance head to move the maintenance head along the plurality of rail segments of the rail system, wherein the actuation device is configured

as a pulley system, wherein the pulley system includes a first line and a second line, wherein the first line and the second line are each attached to the maintenance head, wherein the first line extends from an opening defined by the rail system and through the plurality of rail segments to the maintenance head in a first circumferential direction, and wherein the second line extends from the opening and through the plurality of rail segments to the maintenance head in a second circumferential direction.