CLAIMS:

1. An adaptive repair method comprising:
providing a digitized model of a base portion of a physical component;
aligning a corresponding base portion of a nominal CAD model of the physical component with the digitized model of the base portion of the physical component such that the nominal CAD model extends beyond the digitized model of the base portion of the physical component used for alignment;
extracting a set of co-ordinate points from the nominal CAD model once aligned;
lofting a cross-sectional profile based on a measured profile of the base portion along a path defined by the co-ordinate points of the nominal CAD model once aligned to the digitized model of the base portion of the physical component to create an adapted model for repair of the physical component; and
adding material to the physical component based on the adapted model as part of adaptively repairing the physical component.

2. An adaptive repair method according to claim 1, wherein the digitized model of the base portion of the physical component is created by digitizing an entire component and electronically cutting back the resulting model to a predetermined crop plane.

3. The adaptive repair method according to claim 1, wherein the physical component (20) is physically cut back before digitized to create the digitized model of the base portion of the physical component.

4. The adaptive repair method according to claim 1, wherein the cross-sectional profile is adapted to create an oversized material addition region in the adapted model for adding material to the physical component.

5. The adaptive repair method according to claim 1, wherein the adapted model includes tool path data within the oversized material addition region for a reprofiling step in the adaptive repair process.

6. The adaptive repair method according to claim 1, further comprising the step of machining the physical component based on the adapted model.

7. The adaptive repair method according to claim 1, wherein the physical component is an aerofoil blade and the co-ordinate points comprise points at the leading edge and/or trailing edge of the blade.

8. The adaptive repair method according to claim 7, wherein the co-ordinate points comprise points on the concave and/or convex surfaces of the aerofoil blade.

9. The adaptive repair method according to claim 1, wherein the co-ordinate points are located in a number of planes, at least one of the planes intersecting the digitized model of the base portion of the physical component, and at least one plane being located beyond the digitized model of the base portion of the physical component.

10. The adaptive repair method according to claim 9, wherein at least ten planes are located beyond the digitized model of the base portion of the physical component.

11. The adaptive repair method according to claim 9, wherein at least three planes intersect the digitized model of the base portion of the physical component.

12. The adaptive repair method according to any of claims 9, wherein at four planes intersect the digitized model of the base portion of the physical component and seventeen planes are located beyond the digitized model of the base portion of the physical component.

13. An adaptive repair method comprising:
providing a component, a digitized model of a portion of the component, and an adapted model; and
adding material to the component based on the adapted model as part of adaptively repairing the component, wherein the adapted model is provided by:

aligning a corresponding portion of a nominal CAD model of the component with the digitized model of the base portion of the component such that the nominal CAD model extends beyond the digitized model of the portion of the component, extracting a set of co-ordinate points from the aligned nominal CAD model, and lofting a cross-sectional profile based on a measured profile of the portion along a path defined by the co-ordinate points of the aligned nominal CAD model to create the adapted model for repair of the component.

14. The adaptive repair method according to claim 13, further comprising machining the component based on the adapted model.

15. The adaptive repair method according to claim 13, wherein the digitized model of the portion of the component is created by digitizing an entire component and electronically cutting back the resulting model to a predetermined crop plane.

16. The adaptive repair method according to claim 13, wherein the component is physically machined before digitizing to create the digitized model of the portion of the component.

17. An adaptive repair method comprising:
providing a digitized model of a base portion of a physical component;
aligning a corresponding base portion of a nominal CAD model of the physical component with the digitized model of the base portion of the physical component such that the nominal CAD model extends beyond the digitized model used for alignment;
extracting a set of co-ordinate points from the aligned nominal CAD model;
lofting a cross-sectional profile based on a measured profile of the base portion along a path defined by the co-ordinate points of the aligned nominal CAD model to create an adapted model for repair of the physical component; and
machining the physical component based on the adapted model.

18. The adaptive repair method according to claim 17, wherein the digitized model of the base portion of the physical component is created by digitizing an

entire component and electronically cutting back the resulting model to a predetermined crop plane.

19. The adaptive repair method according to claim 17, wherein the physical component is physically machined before digitizing to create the digitized model of the base portion of the physical component.

20. The adaptive repair method according to claim 17, wherein the adapted model includes tool path data within the oversized material addition region for a reprofiling step in the repair process.