WHAT IS CLAIMED IS:

1. A method comprising:

delivering, using a material delivery device, material adjacent to a repair surface of a component, wherein the repair surface is a surface of the component to which material is being added;

delivering, using a cooling gas delivery device, a cooling gas adjacent to the repair surface;

delivering, from an energy source, energy to the material adjacent the repair surface to fuse the material to the repair surface;

receiving, by a computing device, at least one parameter indicative of at least one of ~~a temperature or~~ a geometry of a surface feature in a portion of the component to which material is being added or a geometry of the portion of the component to which material is being added; and

responsive to the at least one parameter indicative of the at least one of the geometry of the surface feature in the portion of the component to which material is being added~~temperature~~ or the geometry of the portion of the component to which material is being added, controlling, by the computing device, at least one processing parameter to control the temperature of the portion of the component to which material is being added and form a predetermined microstructure in the material fused to the repair surface.

~~2. The method of claim 1, wherein receiving the at least one parameter indicative of the at least one of the temperature or the geometry of the component comprises receiving at least one parameter indicative of a local temperature of a portion of the component, and wherein controlling the at least one processing parameter to control the temperature of the component comprises controlling at least one processing parameter to control the local temperature of the portion of the component.~~

~~3~~2. The method of claim 1, further comprising detecting, by at least one sensor, the at least one parameter indicative of~~the at least one of the temperature or~~ the geometry of the component.

~~4~~3. The method of claim 1, wherein the at least one sensor comprises ~~at least one of a thermal camera or~~ a visual camera, and wherein the at least one parameter comprises at least one of a geometry of the component, ~~a melt pool geometry,~~ a surface feature geometry, or a presence of a defect~~, or a temperature of the component~~.

~~5~~4. The method of claim 1, wherein controlling the at least one processing parameter to control the temperature of the portion of the component to which material is being added comprises controlling, by the computing device, at least one of a power level of the energy source, a focal spot size of an energy beam delivered adjacent to the repair surface, material delivery rate, relative movement of a focal spot of the energy beam relative to the component, a pause time between bursts of energy, a standoff between the focal spot and the repair surface, or a tool path followed by an energy delivery head.

~~6~~5. The method of claim 1, wherein controlling the at least one processing parameter to control the temperature of the portion of the component to which material is being added comprises controlling, by the computing device, at least one of a flow rate of cooling gas adjacent to the component or a position of the cooling~~a~~ gas delivery device relative to the component.

~~7~~6. The method of claim 1, wherein the component comprises at least one of a gas turbine engine blade, a gas turbine engine blisk, or a gas turbine engine blisk drum.

87. The method of claim 1, further comprising removing a damaged portion of the component to define the repair surface.

98. A system comprising:

a material delivery device;

a cooling gas delivery device;

an energy source;

an energy delivery head;

at least one sensor; and

a computing device, wherein the computing device is configured to:

control the material delivery device to deliver material adjacent to a repair surface of a component, wherein the repair surface is a surface of the component to which material is being added;

control the gas delivery device to deliver a gas adjacent to the repair surface;

control the energy source and the energy delivery head to deliver energy to the material adjacent the repair surface to fuse the material to the repair surface;

receive, from the at least one sensor, at least one parameter indicative of at least one of ~~a temperature or~~ a geometry of a surface feature in a portion of the component to which material is being added or a geometry of the portion of the component to which material is being added; and

responsive to the at least one parameter indicative of the at least one of the geometry of the surface feature in the portion of the component to which material is being added~~temperature~~ or the geometry of the portion of the component to which material is being added, control at least one processing parameter of the system to control the temperature of the portion of the component to which material is being added and form a predetermined microstructure in the material fused to the repair surface.

~~10. The system of claim 9, wherein the at least one parameter indicative of the at least one of the temperature or the geometry of the component comprises at least one parameter indicative of a local temperature of a portion of the component, and wherein the computing device is configured to control the at least one processing parameter of the system to control the local temperature of the portion of the component.~~

~~11~~9. The system of claim ~~9~~8, wherein the at least one sensor comprises ~~at least one of a thermal camera or~~ a visual camera, and wherein the at least one parameter comprises a geometry of the component, ~~a melt pool geometry,~~ a surface feature geometry, or a presence of a defect~~, or a temperature of the component~~.

~~12~~10. The system of claim ~~9~~8, wherein the at least one processing parameter comprises at least one of a power level of the energy source, a focal spot size of an energy beam delivered adjacent to the repair surface, a material delivery rate, relative movement of a focal spot of the energy beam relative to the component, a pause time between bursts of energy, a standoff between the focal spot and the repair surface, or a tool path followed by an energy delivery head.

~~13~~11. The system of claim ~~9~~8, wherein the at least one processing parameter comprises at least one of a flow rate of cooling gas adjacent to the component or a position of the cooling~~a~~ gas delivery device relative to the component.

~~14~~12. The system of claim ~~9~~8, wherein the component comprises at least one of a gas turbine engine blade, a gas turbine engine blisk, or a gas turbine engine blisk drum.

~~15~~13. A computer-readable storage medium comprising instructions that, when executed, cause at least one processor to:

control a material delivery device to deliver material adjacent to a repair surface of a component, wherein the repair surface is a surface of the component to which material is being added;

control a cooling gas delivery device to deliver cooling gas adjacent to the repair surface of a component;

control an energy source and an energy delivery head to deliver energy to the material adjacent the repair surface to fuse the material to the repair surface;

receive, from at least one sensor, at least one parameter indicative of at least one of ~~a temperature or~~ a geometry of a surface feature in a portion of the component to which material is being added or a geometry of the portion of the component to which material is being added; and

responsive to the at least one parameter indicative of the at least one of the geometry of the surface feature in the portion of the component to which material is being added~~temperature~~ or the geometry of the portion of the component to which material is being added, control at least one processing parameter of the system to control the temperature of the portion of the component to which material is being added and form a predetermined microstructure in the material fused to the repair surface.

~~16. The computer-readable storage medium of claim 15, wherein the instructions that, when executed, cause the at least one processor to receive the at least one parameter indicative of the at least one of the temperature or the geometry of the component comprise instructions that, when executed, cause the at least one processor to receive at least one parameter indicative of a local temperature of a portion of the component, and wherein the instructions that, when executed, cause the at least one processor to control the at least one processing parameter of the system to control the temperature of the component comprise instructions that, when executed, cause the at least one processor to control at least one processing parameter of the system to control the local temperature of the portion of the component.~~

~~17~~14. The computer-readable storage medium of claim ~~15~~13, wherein the at least one sensor comprises ~~at least one of a thermal camera or~~ a visual camera, and wherein the at least one parameter comprises at least one of a geometry of the component, ~~a melt pool geometry,~~ a surface feature geometry, or a presence of a defect~~, or a temperature of the component~~.

~~18~~15. The computer-readable storage medium of claim ~~15~~13, wherein the at least one processing parameter comprises at least one of a power level of the energy source, a focal spot size of an energy beam delivered adjacent to the repair surface, a material delivery rate, relative movement of a focal spot of the energy beam relative to the component, a pause time between bursts of energy, a standoff between the focal spot and the repair surface, or a tool path followed by an energy delivery head.

~~19~~16. The computer-readable storage medium of claim ~~15~~13, wherein the at least one processing parameter comprises at least one of a flow rate of cooling gas adjacent to the component or a position of the cooling~~a~~ gas delivery device relative to the component.

~~20~~17. The computer-readable storage medium of claim ~~15~~13, wherein the component comprises at least one of a gas turbine engine blade, a gas turbine engine blisk, or a gas turbine engine blisk drum.