WHAT IS CLAIMED IS:

1. A deployable manufacturing center (DMC) system for manufacturing metal parts comprising:

a foundry module comprising a first container and a metallurgical system in the first container configured to convert a raw material into an alloy powder; and

an additive manufacturing (AM) module comprising a second container and an additive manufacturing system in the second container configured to form the alloy powder into the metal parts,

wherein the raw material comprises a scrap metal feedstock and the foundry module is configured to analyze a chemical composition of the feedstock, to remove contaminants and hazardous components from the feedstock, to cut pieces of the feedstock to smaller chunks, to melt the feedstock to form a molten metal, to correct the chemical composition of the molten metal using selected chemical additives, to atomize the molten metal into the alloy powder, to collect the alloy powder, and then to analyze the alloy powder.

2. The deployable manufacturing center (DMC) system of claim 1 wherein the metallurgical system includes a mixing cold hearth and an atomization system, and the additive manufacturing (AM) system includes a 3-D printer.

3. The deployable manufacturing center (DMC) system of claim 1 further comprising a machining module comprising a third container and a machining system in the third container configured to machine rough metal parts formed by the additive manufacturing (AM) module.

4. The deployable manufacturing center (DMC) system of claim 1 further comprising a quality conformance (QC) module comprising a fourth container and an inspection and evaluation system in the fourth container configured to inspect and evaluate the metal parts.

5. The deployable manufacturing center (DMC) system of claim 1 wherein the first container and the second container comprise metal shipping containers.

6. The deployable manufacturing center (DMC) system of claim 1 wherein the raw material comprises scrap metal.

~~7. The deployable manufacturing center (DMC) system of claim 1 wherein the raw material comprises a scrap metal feedstock and the foundry module is configured to analyze the chemical composition of the feedstock, to remove contaminants and hazardous components from the feedstock, to cut pieces of the feedstock to smaller chunks, to melt the feedstock to form a molten metal, to correct the composition of the molten metal using selected chemical additives, to atomize the molten metal into the alloy powder, to collect the alloy powder, and then to analyze the alloy powder.~~

~~8~~7. The deployable manufacturing center (DMC) system of claim 1 wherein the additive manufacturing system comprises a system selected from the group consisting of 3-D printer systems, direct energy deposition systems, powder bed fusion systems and cold spray systems.

~~9~~8. The deployable manufacturing center (DMC) system of claim 1 wherein the additive manufacturing module further comprises a heat treatment system for heat treating as-printed metal parts.

~~10~~9. A deployable manufacturing center (DMC) system for manufacturing metal parts comprising:

an array of transportable modules containing equipment configured to convert a raw material into an alloy powder, and then to build the metal parts from the alloy powder using an additive manufacturing (AM) process,

the modules including a foundry module comprising a first container and a metallurgical system in the first container comprising a mixing cold hearth configured to melt the raw material into a molten metal and an atomization system configured to atomize the molten metal into the alloy powder, the mixing cold hearth comprising a composition correction system for adding additives to the molten metal;

an additive manufacturing (AM) module comprising a second container and a

3-D printer in the second container configured to form the alloy powder into rough metal parts; and

a machining module comprising a third container and a machining system in the third container configured to machine the rough parts into the metal parts.

~~11~~10. The deployable manufacturing center (DMC) system of claim ~~10~~ 9 further comprising a quality conformance (QC) module comprising a fourth container and an inspection and evaluation system in the fourth container configured to inspect and evaluate the metal parts.

~~12~~11. The deployable manufacturing center (DMC) system of claim ~~10~~ 9 wherein the raw material comprises scrap metal, and the foundry module further comprises an analysis instrument configured to analyze the scrap metal, and a saw configured to cut the scrap metal into chunks.

~~13~~12. The deployable manufacturing center (DMC) system of claim ~~10~~ 9 wherein the machining system includes polishing equipment and turning equipment.

~~14~~13. The deployable manufacturing center (DMC) system of claim ~~10~~ 9 wherein the additive manufacturing (AD) module further comprises a heat treatment system for heat treating the rough metal parts.

~~15~~14. The deployable manufacturing center (DMC) system of claim ~~10~~ 9 wherein the first container, the second container and the third container comprise metal shipping containers.

~~16~~15. The deployable manufacturing center (DMC) system of claim ~~10~~ 9 wherein the foundry module further comprises a SEM apparatus configured to confirm particle size, microstructure, and elemental composition of the alloy powder.

~~17. The deployable manufacturing center (DMC) system of claim 10 wherein the mixing cold hearth further comprises a composition correction system for adding~~

~~additives to the molten metal.~~

~~18~~16. A process for manufacturing metal parts comprising:

providing a deployable manufacturing center (DMC) system comprising a foundry module comprising a first container containing a metallurgical system configured to convert a raw material into an alloy powder, and an additive manufacturing (AM) module comprising a second container containing an additive manufacturing system configured to build rough metal parts from the alloy powder, the foundry module comprising a mixing cold hearth configured to melt the raw material into a molten metal and a composition correction system for adding additives to the molten metal, the additive manufacturing (AM) module further comprising an atomization system configured to atomize the molten metal into the alloy powder;

deploying the deployable manufacturing center (DMC) system to a desired location;

forming the alloy powder from the raw material using the foundry module; and

forming the rough metal parts from the alloy powder using the additive manufacturing (AM) module.

~~19~~17. The process of claim ~~18~~ 16 further comprising providing a machining module comprising a third container containing machinery configured to machine the rough metal parts, and then machining the rough metal parts into machined metal parts using the machining module.

~~20~~18. The process of claim ~~18~~ 16 further comprising providing a quality conformance (QC) module comprising a fourth container containing equipment configured to inspect and evaluate the metal parts; and then inspecting and evaluating the metal parts using the quality conformance (QC) module.

~~21. The process of claim 18 wherein the foundry module comprises a mixing cold hearth configured to melt the raw material into a molten metal and an atomization system configured to atomize the molten metal into the alloy powder.~~

~~22. The process of claim 21 wherein the mixing cold hearth further comprises a composition correction system for adding additives to the molten metal.~~

~~23~~19. The process of claim ~~18~~ 16 wherein the additive manufacturing (AM) module comprises a 3-D printer.

~~24~~20. The process of claim ~~18~~ 16 wherein the additive manufacturing module further comprises a heat treating system and further comprising heat treating the rough metal parts using the heat treating system.

~~25~~21. The process of claim ~~18~~ 16 wherein the raw material comprises scrap metal and the foundry module further comprises an analysis instrument configured to analyze the scrap metal, and further comprising analyzing the scrap metal using the analysis instrument.

~~26~~22. The process of claim ~~18~~ 16 wherein the raw material comprises battlefield material and the desired location is proximate to the battlefield.