WHAT IS CLAIMED IS:

1. A system for repairing a composite first material, the system for maintaining a temperature difference between a composite first material located proximate to a second material during the repair, the system comprising:

the composite first material having a first side and a second side,

the second material having a first side and a second side, with the first side of the second material located proximate to the second side of the composite first material,

a heat source positioned proximate to the first side of the composite first material;

a thermoelectric device positioned proximate to the second side of the second material;

a temperature sensing device in contact with the second side of the second material, wherein the temperature sensing device is a thermocouple and wherein the thermoelectric device is in communication with the thermocouple;

a controller in communication with the thermoelectric device and the temperature sensing device, wherein the controller is configured to control a current directed from an electric source to the thermoelectric device.

2. The system of claim 1, wherein the thermoelectric device is configured to contact the second material.

3. The system of any one of claims 1-2, wherein the thermoelectric device is a Peltier device.

4. The system of claim 1, wherein the thermocouple is a first thermocouple and wherein the controller is a first controller, the apparatus further comprising:

thermocouple wires attached to the first thermocouple, the thermocouple wires being connected to the first controller;

a thermoelectric device power source connected to the thermoelectric device via power lines;

a heat source power source in contact with the heat source via heat source wires;

a second thermocouple in contact with the heat source; and

a second controller in contact with the second thermocouple via thermocouple wires.

5. The system of any one of claims 1-4, in which the composite first material is an aircraft wing skin lower panel.

6. The system of any one of claims 1-5, in which the second material comprises a shear tie.

7. The system of claim 6, in which the shear tie comprises a metal.

8. The system of claim 7, in which the shear tie comprises aluminum alloy.