Personal Electronic Device Climate Controlled Container (PED-CCC)

Overview:
Our sponsor, Bechtel Plant Machinery Inc, whose employees cannot bring their personal electronic devices into their work environment, hence, they leave their phones and other devices at home or most commonly in their cars. BPMI operates outside of Pittsburgh, PA. Western Pennsylvania can experience really hot summers and brutally cold winters. Because of this, we have 2 main times of the year that a car is not a suitable storage place for their phones. Therefore, PED-CCC is an ideal candidate for the storage of phones in a car.

Objectives:
The PED-CCC for BPMI has general objectives that we must meet. Our enclosure must be able to withstand external temperatures of 0 - 120 degrees Fahrenheit. The inside of the box however, must not exceed either 32 or 95 degrees. The container must also be able to survive a drop of 4 feet without damaging the container itself or the enclosed phone. Information display is important to our design. We must monitor the inside temperature of the container, display that temperature, and display whether the unit is heating, cooling or idle.

Approach:
- Get the objectives of the project from the scope of work
- Brainstorm some initial plans
- Research on the choices of heating system and cooling system
- Use SolidWorks to simulate certain situation to determine the heating load
- Create SolidWorks model to build the container
- Mount equipments like insulation material and electronic components
- Perform test to evaluate heating and cooling performance

Outcome:
- The heating system will keep the phone safe on a very cold winter day
- The cooling system will not prevent the phone from being damaged on a hot day
- The box survived four foot drop test in SolidWorks simulation
- Systems activate properly when internal temperature approaches dangerous range