TA Station Power

TIM Meeting, 4/12/2016
Why Lithium?
- Significant weight and volume savings (41.9Wh/lb vs 21.25Wh/lb)
- Improved cold weather and self discharge performance
- Improved lifespan
- Increased cost and complexity
Lithium Battery Block Diagram

- Four 3.4V, 180Ah cells in each battery
- Voltage and temperature sensing on each cell
- Active cell balancing to prevent capacity mismatch
- Sub millisecond control of output terminals
  - Short circuit, under/over voltage, under/over temperature protections

**Issues:**
1. Switch that controls battery output has failed in many batteries deployed in the field
Lithium Battery Failures in the Field

- Corrosion build up due to liquid water on the batteries (evaporation/condensation cycle in the huts)
- Susceptibility of MOSFET devices to damage (environment caused failure? Part failure? Combination of both?)
battery Bag for Lithium Batteries

- Vapex – proprietary material that allows water vapor transfer but not liquid water
- Tough outer material that protects for tears and reduces vapor permeability
- Insulate the batteries so they are not the coldest material in the hut
- Provide a barrier to prevent liquid water from getting into contact with the batteries and circuit boards
Battery bag performance in Anchorage test hut

Next Steps:
• Vent design has been chosen and will be installed in huts this season
• Improved methods of sealing the door of the hut