

Battery State-of-Charge Indicator

Battery State-of-Charge Indicator (BattSOICI)TM



Improving Reliability Through Health Monitoring and Predictive Maintenance Connects Technology To Business...

The primary battery usage philosophy prevailing in the MARCOR / ARMY is to replace a battery used once on a mission with a fresh one, rather than take a used battery back out in the field with an uncertain amount of remaining run time. This leads to high costs associated with tossing used batteries that have unknown remaining charge. Battery SOC Indicator (BattSOICI)TM can accurately assess the SOC of soldier power batteries.



When integrated into an overall health management system, BattSOICITM will reduce battery weight burden (must carry extra batteries to replace used batteries), reduce the risk of the false ID of batteries that have appropriate capacity for specific power needs during a mission. Organizations which can benefit are MARCOR PM Expeditionary Power Systems, Army (soldier power), Air Force Research Laboratory and the commercial transportation (electric bus, automotive, etc.).

Soldier Power Batteries (Li-CFx & Metal-Air)



SOCI Prototype



Logistic Personnel



Soldiers

What can BattSOICITM do?

- Accurately estimate SOC with 5% error or less.
- Works with chemistries with (near) flat or sloped discharge.

Which technologies does BattSOICITM use?

- Electrical/Environmental Sensors
- Neural Networks
- Low Power Microcontroller

BattSOICITM

SOC Indicator Benefits

- Reduction in Costs due to Premature Replacement of Batteries
- Increased Acceptability & Full Use
- Increased Reliability

DETECT!

The BattSOC1 has the ability to monitor battery SOC in real-time and other characteristics to provide unique relationship to SOC for chemistries with discharge behaviors.

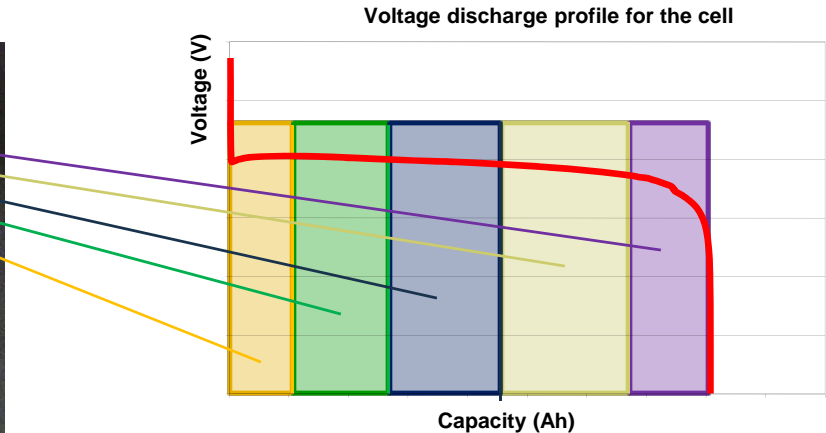
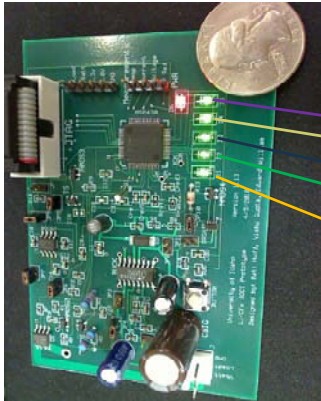
- ❖ **Statistical Analysis**
- ❖ **Time Domain based Feature Extraction**

PREDICT!

BattSOC1 has the ability to predict SOC with 95% accuracy or more using features extracted electrical and environmental sensors.

- ❖ **SOC Algorithms Learn Offline**
- ❖ **Trained Using Experimental & Physics-based Model Data**

BattSOC1!



CHARACTERISTICS!

- ❖ **Low Power Consumption**
- ❖ **~ 0.12W per cycle**
- ❖ **< 7% power drain per year**



7% - 1 year
14% - 2 year

LOW COST!