

Member Update

NAATBatt Annual Meeting
March 13, 2019

Donald Karner



WE MAKE BATTERIES WORK

**Testing &
Certification**

**Battery
Applications**

**Research &
Development**

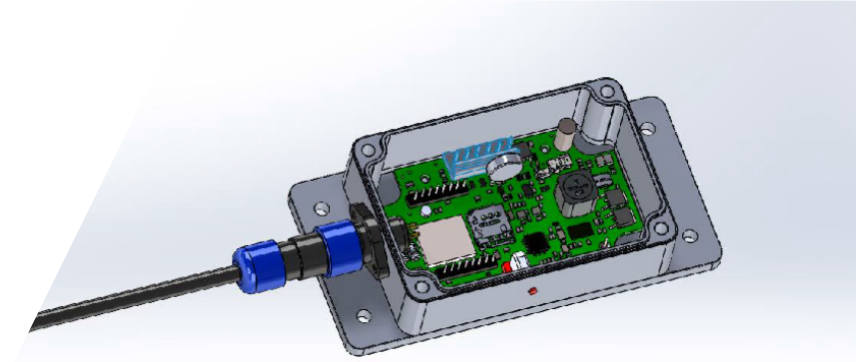


**WatchDog[®]
International**

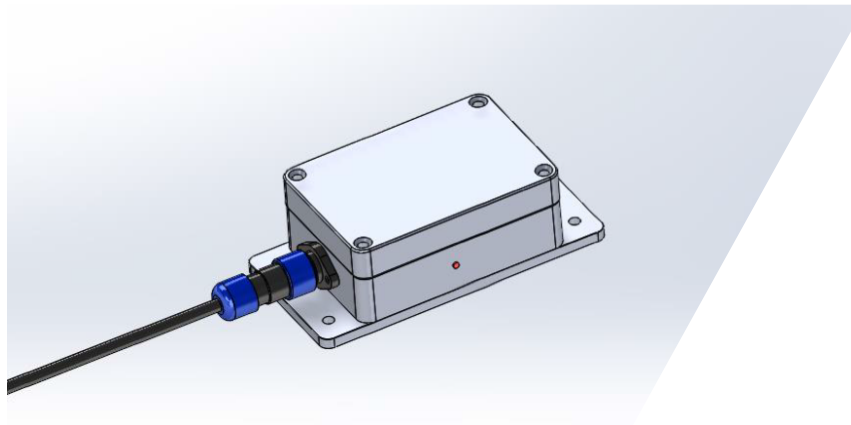
IoT Enabled Expert Battery Monitoring



**WatchDog®
International**



Key Elements



WatchDog® Hardware

- battery voltage & temperature
- geo-location data & time
- secure Cloud data transmission
- simple two-wire non-intrusive installation



WatchDog[®] International

Key Elements

WatchDog[®] Analytics

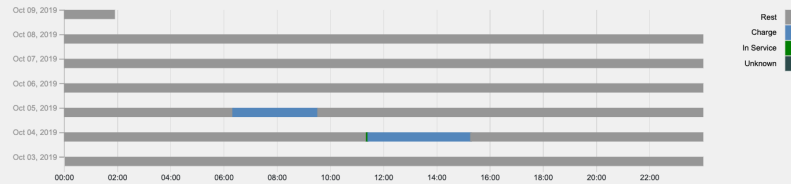
- application specific
- machine learning expert analyses
- battery conditions & threats
- operational metrics
- group & exogenous data analysis
- 98 worldwide patents



Operating History

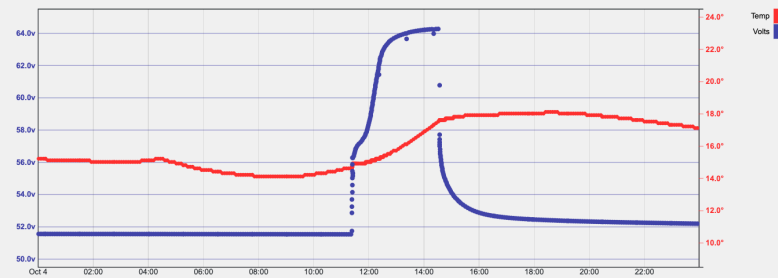
Voltage / Temperature	<24.0v	>24.0 to 36.0v	>36.0 to 40.0v	>40.0 to 44.0v	>44.0 to 52.0v	>52.0 to 54.0v	>54.0 to 56.0v	>56.0 to 58.0v	>58.0 to 60.0v	>60.0v
>10.0 to 20.0°C	0	0	0	0	709	152	4	23	7	43
>20.0 to 30.0°C	0	0	0	5	854	323	76	247	29	61
>30.0 to 40.0°C	0	0	0	0	32	5	3	1	0	0

Operating Mode



Operating Data

Day: Fri Oct 04 2019 00:02:39 GMT-0700



WatchDog® International

WatchDog® User Interface

- WatchDog provisioning
- secure access to complete history
- configurable analytics
- e-mail & text Alert notification
- geo-location tracking

Key Elements



**WatchDog®
International**

βeta Test



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