



**The BetaBattery™**  
***A Long-Life, Self-Recharging Battery***

**Arlington Technology Association**

**3 March 2010**

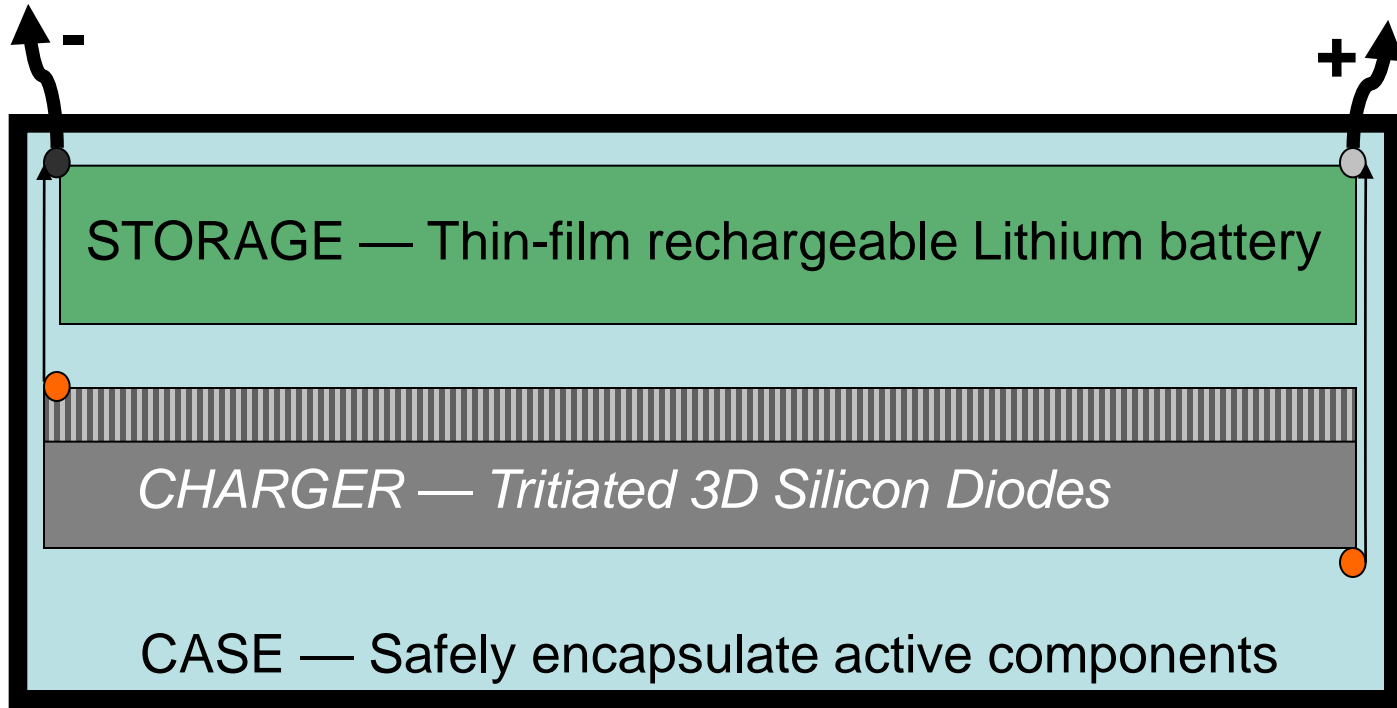


## Battery Life *Too Short* for Critical Applications

- Require instant performance for 20 years
  - Perform vital functions
  - Transmit indispensable information
- Normal batteries do not last
  - Less than 5 years typical
  - Replacement or recharging not practical
- Unmet \$200 million market segment (5-20 years)
  - Defense, intelligence, security
  - Industrial, civil remote monitoring
  - Medical implant power



# Disruptive *Charger* Technology



***The BetaBattery™ — A Long-Life, Self-Recharging Battery***

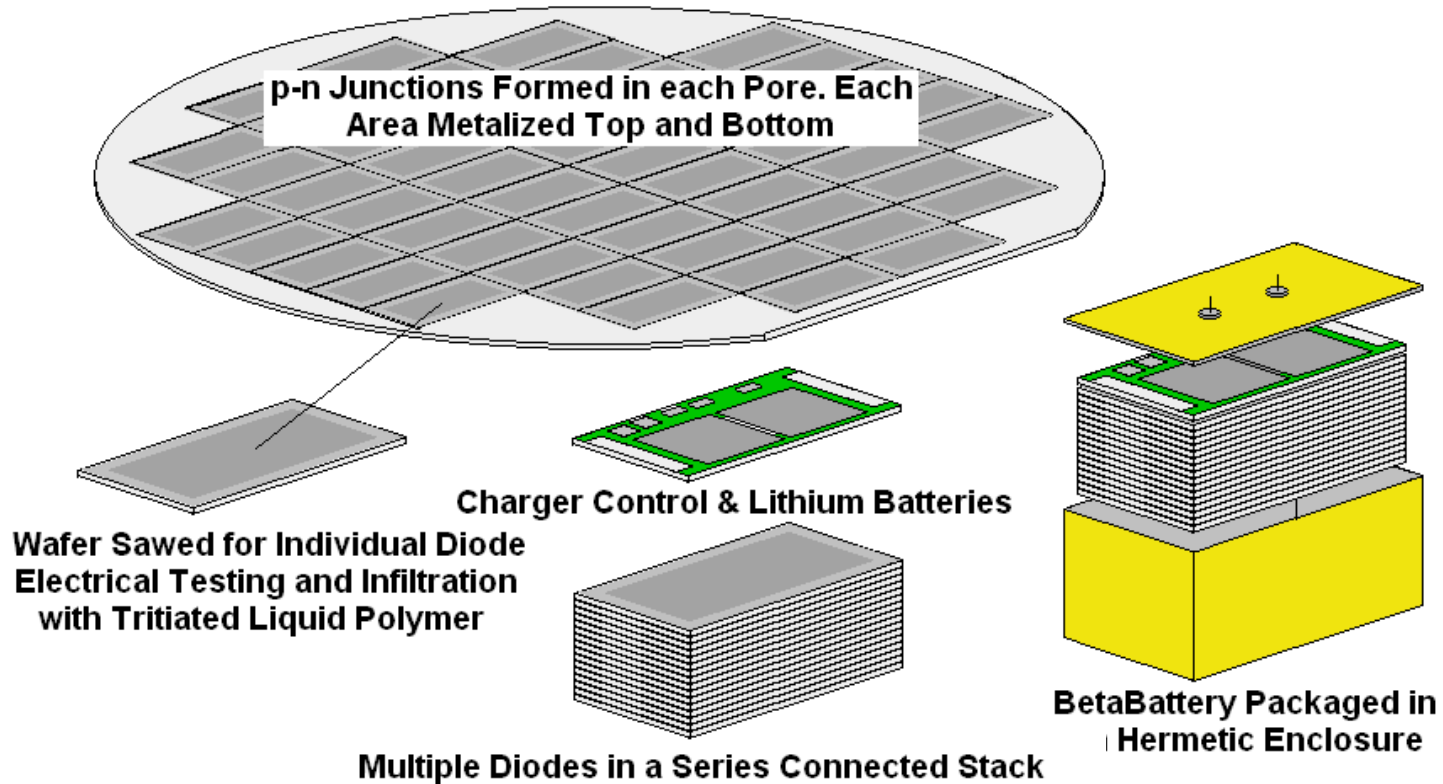


## Self-Recharging BetaBattery™

- Ultra long-life battery pack with built-in charger
  - Low power applications ( $<10\text{V}$ ,  $<100\mu\text{A}$ ,  $<1000\ \mu\text{W}$ )
  - Flexible duty cycle (e.g., 4 mA for 1 sec. every 3 min.)
- Enabling platform technology
  - Perform extremely high value tasks
  - Importance great compared to power cost
- Proven and proprietary IP
  - Own basic patents
  - Developed through SBIR grants from NSF
  - Sponsored university research licensed



# Prototype BetaBattery Fabrication



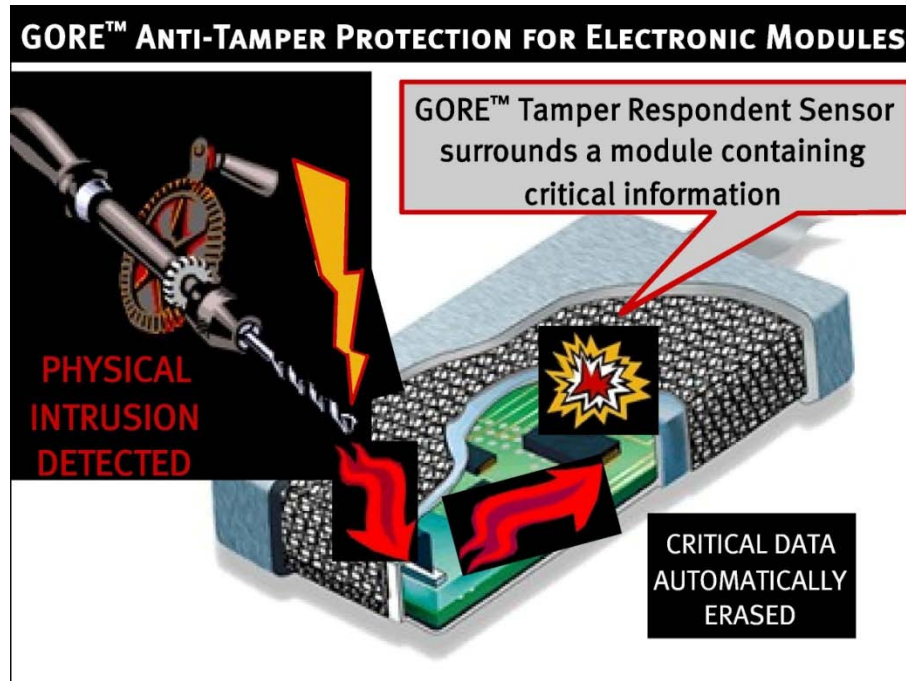
## BetaBattery Fabrication Steps Assembly Procedure



# Anti-Tamper Mandate

DOD requires monitoring hardware

- Power for sealed sensors to inhibit theft of defense IP
- Solution requires power source operating for 15 years minimum
- Lockheed Martin has evaluated prototype BetaBatteries™
- Fast growing need, >10,000 units annually (LMCO estimate)
- Revenue of \$20,000,000 annually 3 years out





# Competition

## Chemical batteries (limited lifetimes):

- Inexpensive
- Huge installed base
- Replacement/recharging can be costly, difficult, or impossible

## Isotope energy conversion: Energy source only coats device surface

Qynergy — Focused on research, no commercial products

Widetronix — Silicon carbide diode, nanoAmp output

City Labs — Gallium phosphide converter, nanoAmp output

## BetaBatt has experience, focus and IP

- Exclusive 3D technology yields lighter, cheaper devices
- ***Safe by design***



# Summary

**BetaBatteries™ are a breakthrough technology**

**BetaBatt's commercialization efforts are collaborative**

**Migrating R&D to Implement Technology for Device Sales**

- Proven – Innovative ultra long-life power technology
- Method – Process to make self-recharging battery
- Customer – Vital need for defense systems
- IP – Own basic patents, exclusive licenses for methods
- Need – Commercialization and production funds

**Significant Return on Investment –**

- Profitable 2 years after product introduction





# Contact Information

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# Ragone Plot – Power vs Energy

