Where does the power go

• Laptop
  - Display 50-60
  - CPU 20 (30-50% is clock in high performance)
  - HD the rest 20-30

• ZebraNet
  - Transmission of data
Principles of low-power computing

• Global approach
  – Interrupt driven I/O
  – Variable speed clocks
  – Highly optimize the software
  – The right size cache
  – Make the trade-off in speed-delay for components
    • Memory
    • Tune at the circuit level
    • Clock gating
  – Control the user experience
Power density continues to get worse

Surpassed hot-plate power density in 0.5μ.
Not too long to reach nuclear reactor
How to solve the power problem?

• Fuel cells
• Solar
• Nuclear
• Gas powered
• Energy gas
• Beamed power
• Bio-powered
FireTrackerNet

• We want to know....
  – How hot it is
  – Metrics
    • How fast its moving
    • Wind
    • Size
  – People? Pets? Art work?
  – Material that is fueling the fire
FireTrackerNet SPECS

- Survive drop from a helicopter
  - 500 – 2000ft drop
- Sense 2-5ft, temp, wind, chemical detector, water (humidity), pressure, position
- Survive the fire for awhile
  - Minutes to a couple hours
- Communicate information wirelessly
- Cheap – various specialized functions
- Biodegradable