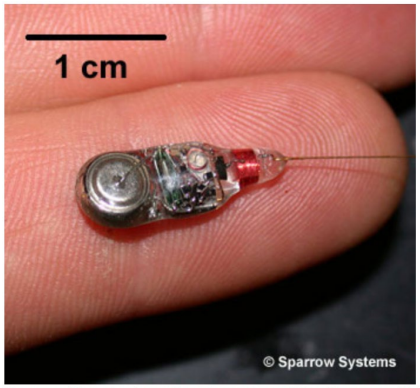
Generic Programmable Tag (GPT)

Original Motivation

- Biologists/Ecologists desire data acquisition systems with:
  - Automated localization
  - Automated Data Telemetry
  - Low cost tags
  - Longer range
  - Programmable
  - Multi-year capability
  - Low tag mass
    - Flying vertebrates can carry no more than ~ 4% of their body mass

Existing Wildlife Tracking Tags

- 50+ years old design with:
  - Fixed frequency by crystal
    - Each custom-made tag
  - No flexibility in transmission scheduling
    - Limited lifetime set by RC time
    - No calendar functionality
  - Trivial signal modulation
    - Data sent via on-off-keying
    - low data rate
    - Unsuitable for Real-time Locating Systems (RTLS)



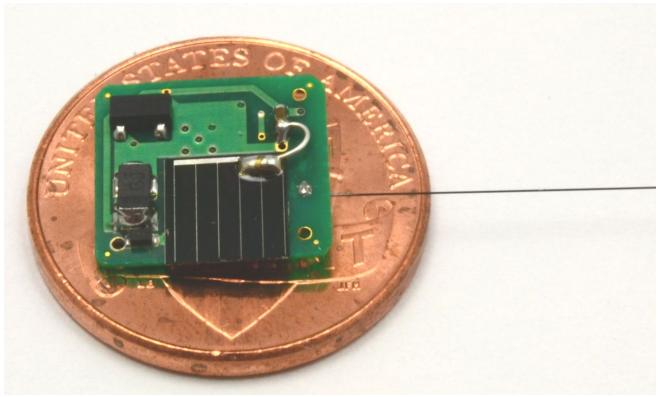
Transmitter designed and produced by Sparrow System [Jim Cochran], Champaign, Ill.

Cornell GPT Technology

- Low mass
- Fully programmable
  - Transmission scheduling with calendar
  - Wide range of operating frequency
  - Various modulation formats
- “Lifetime tag”
  - Solar cells and low energy requirements
- Longer range of coverage
- Cost effective
  - Common hardware with customization via software
- “Inverse-GPS” system for automatic localization in real time with no human intervention required after installation

How It Looks

Universal platform for persistent embedded wireless sensors



Top

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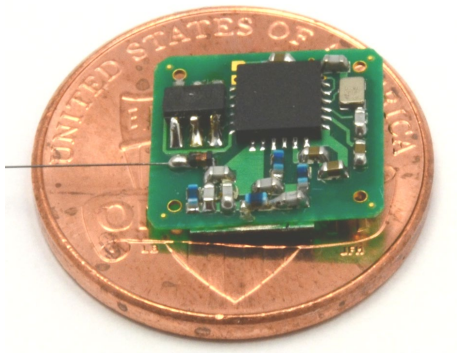

Potential Applications

- Wildlife/people/objects tracking
- Radio-frequency Identification (RFID)
  - Active (E-Zpass, LoJack)
  - Passive (Point-of-sale, inventory/supply chain management)
- Bluetooth Low Energy (BLE)
  - Healthcare sensors (temp, blood pressure, glucose, etc)
  - Sports & Fitness (heart-rate, cadence, etc)
  - Proximity Sensing (electronic leash)
  - Personal Inventory (find lost-items)
- Real-Time Locating System (RTLS)
  - Time-of-flight
  - Passive RFID
  - Direction-of-arrival

For More Information

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  http://cornell.flintbox.com/public/project/25574/