

A Low Power Software Defined Radio Networked Architecture for Digital Camera Image Geotagging

SDR '09

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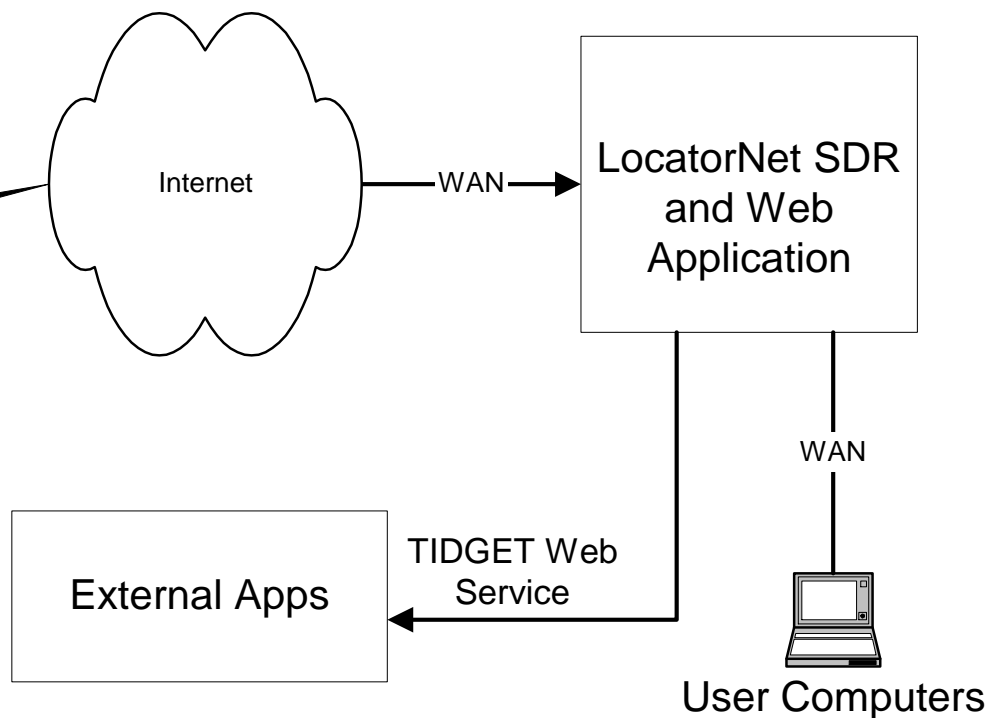
www.navsys.com

Image Geotagging Needs

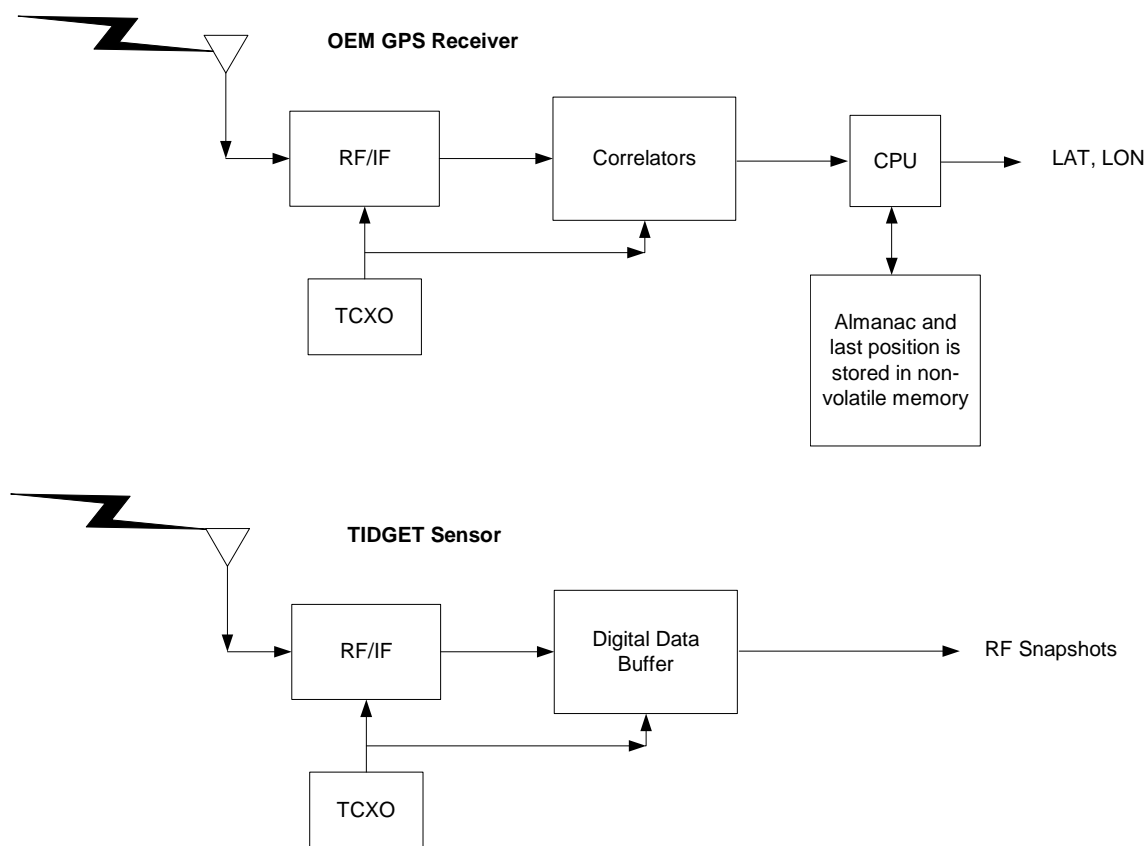
- Opportunity
 - With geotagging the location of a digital photo is captured with the image
 - Allows viewing and sorting of images by location rather than just time
- Challenge
 - Existing products use separate GPS device to tag time and location
 - GPS devices consume too much power
- Solution
 - Low power, low cost geotagging solutions are needed to embed capability in digital cameras and other mobile devices

LocatorNet Software Defined Radio Architecture

Device with
TIDGET Sensor

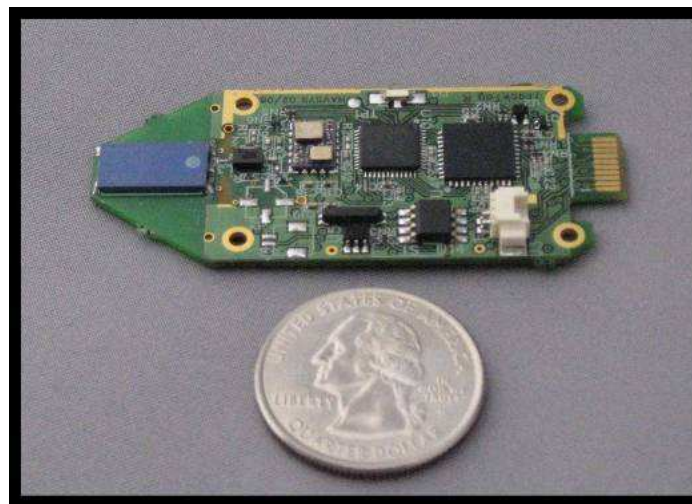
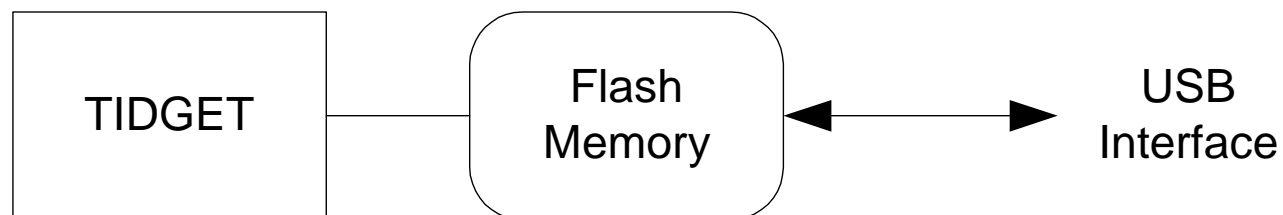


TIDGET Sensor

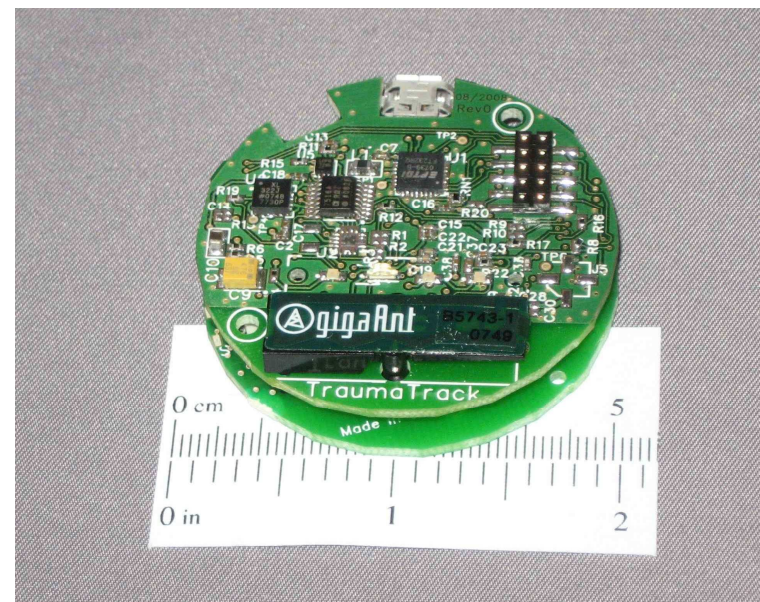
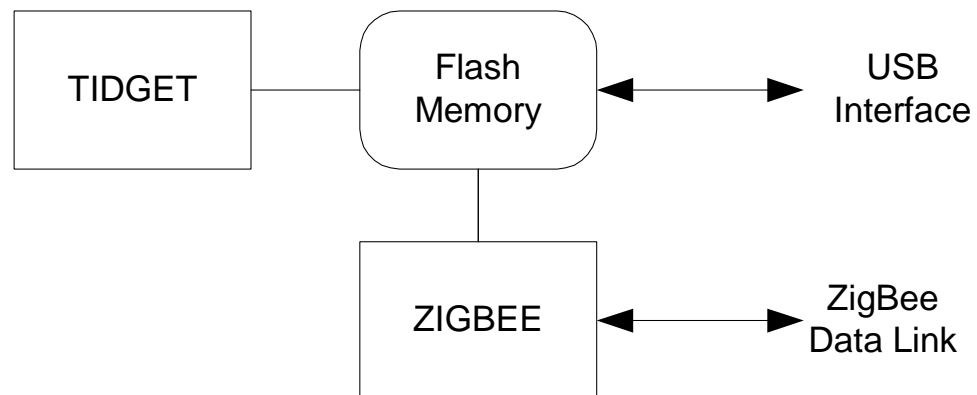


Patented “snapshot GPS” approach reduces power and improves sensitivity through remote processing at Server

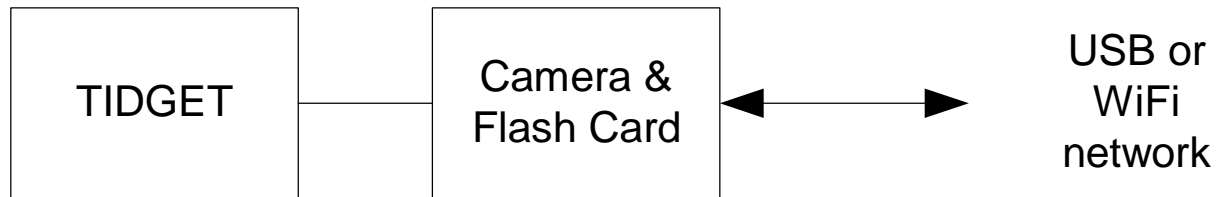
Small Form Factor TrackTag TIDGET Data Logger



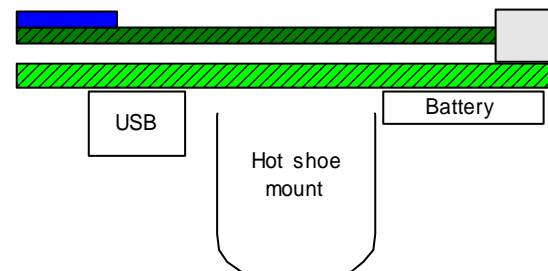
TIDGET/ZigBee Wristwatch Form Factor



TIDGET GeoTagging Design



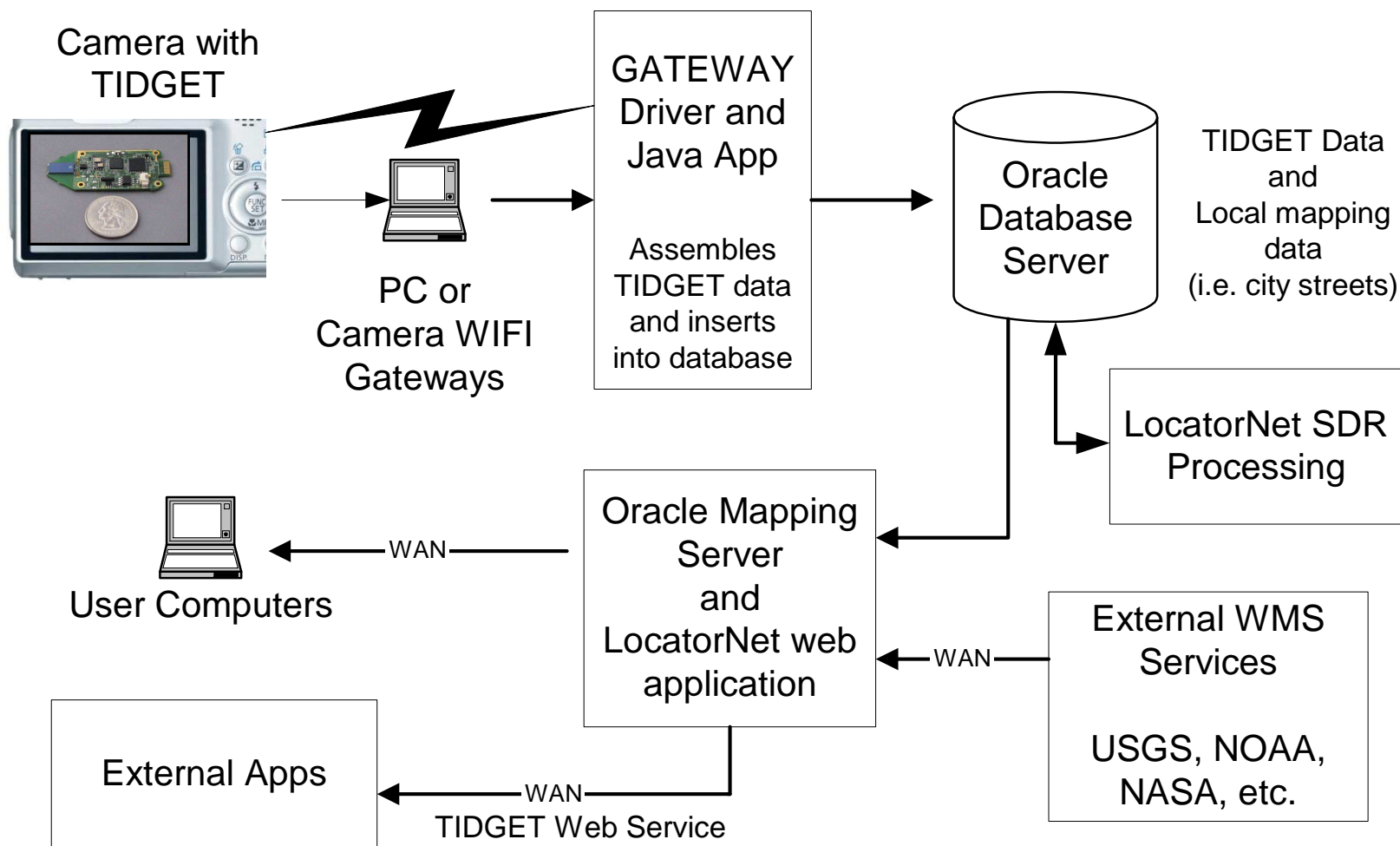
- Option 1:
 - Embedded unit
 - imagename.tdg file recorded on flash
- Option 2:
 - Hot shoe interface
 - Internal flash + USB interface



Power per Fix

- TIDGET Device
 - GPS snapshot capture: 15 mJ
 - Same for open sky or weak signal
 - All-in-view GNSS tracking
- GPS chip set comparison:
 - Open sky: 100 mJ
 - Weak signal: >1350 mJ
 - Power increases with # of GNSS satellites used

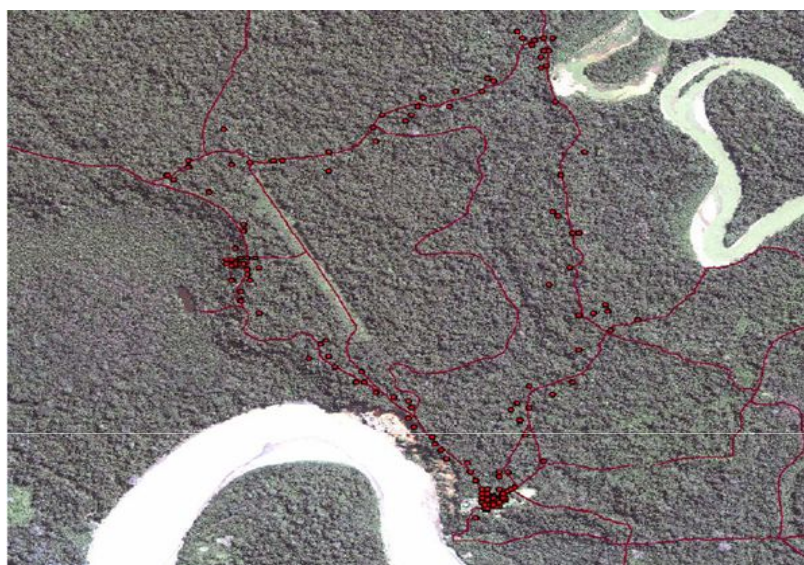
LocatorNet Server Architecture



LocatorNet SDR Snapshot Tracking

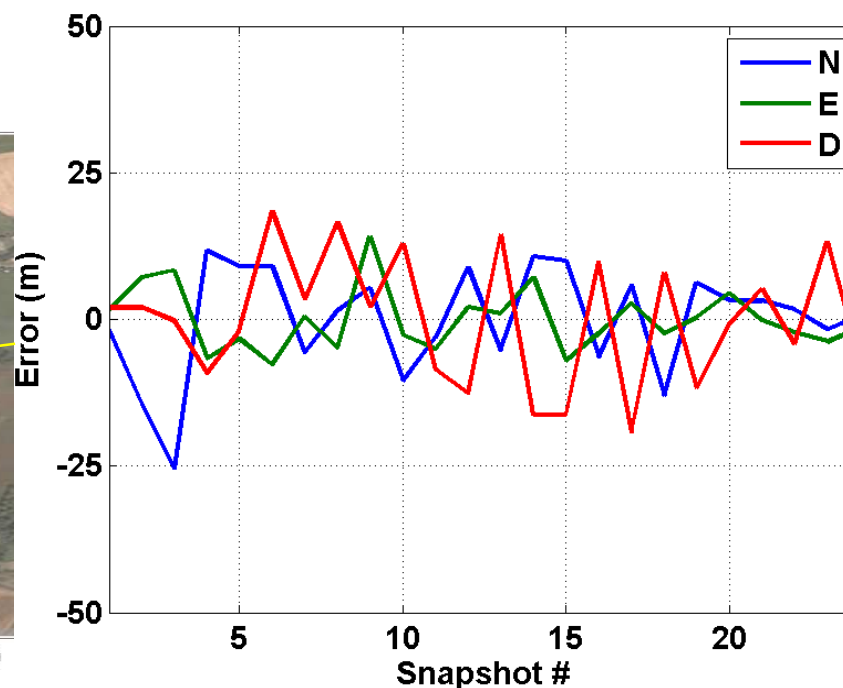
- Nominal Snapshot:
 - 52 msec = 36.4 kbyte (configurable)
 - -148 dBm provides 10 dB SNR
- Enhanced signal processing
 - Uses multiple satellite signals
 - Can detect weak signals to -156 dBm (assumes strongest signal is < -136 dBm)
 - Can be extended to track all L1 GNSS services (e.g. GPS, WAAS, EGNOS, Galileo, GAGAN, new GLONASS, QZ +....)

Snapshot Solution Performance

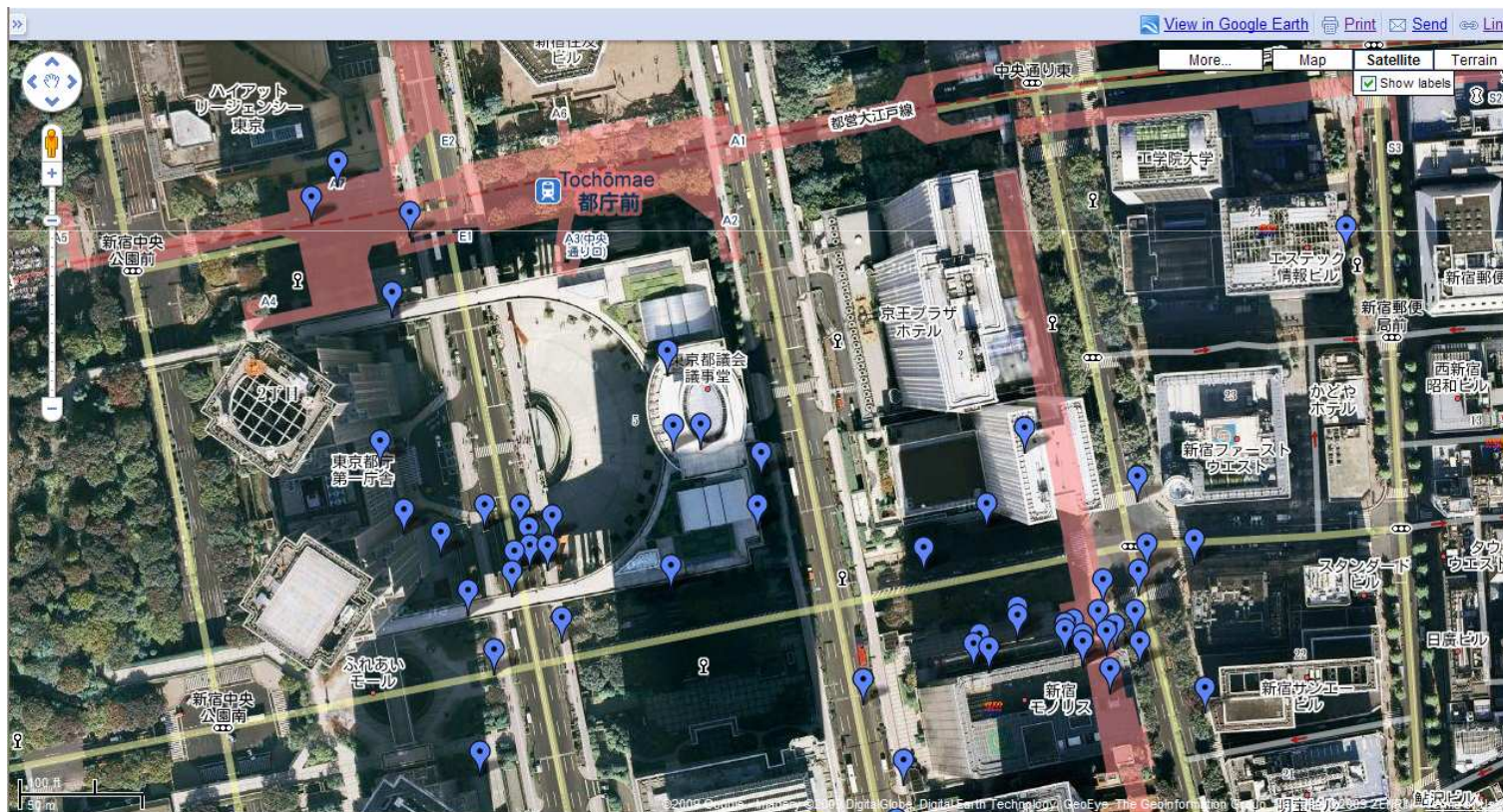


Tracking weak signals
under tree canopy

Clear sky tests showed
CEP=5.14 m



TIDGET TrackTag results in an Urban Environment



LocatorNet Display



TIDGET/LocatorNet Advantages

- Low cost solution using proven COTS RF components
- Small form-factor, ultra-low power design
- Instant-on data capture (no start-up time required)
- All-in-view tracking with multiple GNSS systems
- Operation in weak GNSS signal environments
- Fast signal processing using LocatorNet SDR Server
- Automated geotag meta-data generation through Internet services
- Allows service upgrades to include new GNSS systems