Center for Advanced Knowledge Enablement (CAKE)

A CISE-funded Center

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**Autonomous Lighter Than Air (ALTA): Sub-centimeter Aerial Photography**

Lower than a plane, higher than any street view, Autonomous Lighter Than Air (ALTA) platforms provide a brand new vantage point. ALTA is a smart balloon that transmits images and environmental information from distant locations. ALTA models may be tethered to continuously monitor specific patches of land or sail on air currents along predicted wind-driven paths.

![ALTA Platform and its view of Washington DC.](image)

ALTA's remote-controlled, smart balloons transmit to the Internet geo-referenced super-resolution, oblique imagery, as well as air quality data. The US patented, Federal Aviation Administration (FAA) compliant technology operates from otherwise unreachable places, higher than ground cameras and lower than most planes. Its low cost makes frequent updates cost effective. The ALTA balloons' (R series) ability to operate at low altitudes makes possible aerial photography with unprecedented detail. ALTA's image clarity is not hampered by propulsion vibration or cloud cover. Because of these advantages, ALTA photography often yields higher fidelity images than are produced by other geo-referenced imagery.

Atmospheric graphical information can be attached to the images to depict air quality and other atmospheric data. The ALTA imaging technology http://altadrifter.com is being combined with TerraFly at http://TerraFly.com, see Figure, "TerraFly Maps Enable Monitoring of Airborne Cameras," on page 31. As such, it will be provided as a service via http://TerALTA.com. The ALTA team services public safety, news agencies, agriculture, construction, real estate, travel and tourism. A demonstration prototype is at http://cake.fiu.edu/ALTA.
**Automated Asset Management in Data Centers**

CAKE researchers at Florida Atlantic University developed an innovative solution for visual asset identification using visual features of an image. Visual features of asset images are computed using complex mathematical methods. These visual features are used to identify and match asset images. A database with visual features of asset images was built for every distinct asset that is typically present in large data centers.

A data center is a facility that hosts computer systems, servers, power supplies, storage systems, and other related computing equipment, referred to as assets. The size and number of these data centers are continuously increasing to accommodate the need and demand for web based applications and services. Assets are mounted in racks and a typical rack can accommodate up to 42 assets depending on the asset size. Large data centers have thousands of racks and keeping track of these large numbers of assets manually makes it very tedious and highly prone to errors.

Human errors continue to be the greatest cause of unplanned downtime in data centers. Downtime of assets in data centers lead to slow or unavailable information services on the Internet. Solutions that minimize human input in asset management will lead to higher productivity and reduced downtimes.