Applying Instrumentation & Telemetering Technologies from the DoD Test & Evaluation Arena to Commercial Law Enforcement

Law Enforcement Aerial Platform System (LEAPS)

Presented by:
Michael A. Scardello
Senior VP Programs
Spiral Technology, Inc.

Wednesday 16 May 2012
SESSION A.3 -10:30 AM
LEAPS Mission & Requirements

**LEAPS Mission**
LEAPS has been architected to marry airborne sensors and ground-based instrumentation to augment Law Enforcement and/or Disaster Response and Recovery agencies of counties and municipalities. The mission of LEAPS is to provide an affordable, reliable, manned or unmanned, aerial surveillance system that integrates with existing Law Enforcement and/or Local Government’s infrastructures.

**LEAPS Requirements**

- **Airborne Imaging 10 Hrs./Day, 7 Days/Week**
  - On-Station Time in Visual Flight Rules (VFR) flight conditions

- **Ground Control of Airborne Sensor by Law Enforcement Dispatch Staff**
  - No sensor imagery accessible in the air vehicle

- **Imagery resolution sufficient to see persons and actions from 3,000 feet above ground level (AGL)**

- **Imagery captured and archived with time-tag and geographic location data to allow search retrieval by date/time and latitude/longitude**

- **All Radio Frequency Communications are Encrypted**

- **Access to all Command and Control (C/C) functions as well as imagery requires user authentication**

- **Write Once, Read Many Imagery Archive**
  - Preservation of Evidentiary Material
Selecting the LEAPS Aircraft

The Cessna 172 "Skyhawk" platform was chosen, for many reasons. It is a well proven design, first produced in 1956 and is one of the most popular high-wing aircraft that many have flown and are familiar with. Its low operating costs, high-wing design and speed profile (65-115 Kts) make it the ideal candidate for use as a camera platform such as LEAPS. Many 172's have been deployed in similar "airborne camera" operations. The equipment installed in the LEAPS is already Supplemental Type Certificate (STC) approved.

1979 Cessna Model 172N
LEAPS Operational Concept

Law Enforcement Dispatcher Station
16 May 2012

Law Enforcement Aerial Platform System
Transmitting and Receiving Data

The Airborne Camera

The Aircraft Antenna

Three Antennae on a 150’ Tower

Three radios
Four sectorials
One omni.

Top of the Tower (below the lightning rod)

Omni Directional
Tower Structure, near the top

Sectional Antenna
Sectional Antenna
Sectional Antenna
At the Dispatcher Station, LEAPS presents the following Information:

- Real-Time View from the Camera
- Map Presenting the Location of the aircraft and the camera view angle
- Camera Pointing and Control Information (pan & zoom)
- Aircraft Status
Concept of Operations
Pilot Tasking Tablet

- Desired Ground Track
- Current Aircraft Position
- Point of Interest

Ack
Enroute
OnScene
Leaving
Unable
Loitering
On/Off Duty
Data Archival and Retrieval System

- Real Time storage device has 12 Terabyte capacity which can be expandable to 192 Terabyte capacity.
- Video Storage Array (Tape Based) for archival of recorded video with write once, read many (WORM) media.
- Ability for Law Enforcement to “prune” archived video to catalog and maintain only that which is deemed necessary to support legal actions and playback functions.
- Equipment includes:
  - 2 Cisco Switches
  - Cisco ASA Firewall
  - 2 Uninterruptable Power Supplies
  - Storage Area Network Server
  - Storage Area Network
  - Write Once Read Many Tape Backup System
Video Archive & Retrieve
(Copy Event to DVD)

Software to collect geo-referenced video and photo data in the field, and bring that data into desktops and Web-based maps for improved decision making.

- Improve access to critical decision-making information
- Simplify data recall and analysis
- Eliminate hours of video review and post processing
Sample Down-Linked Video
~ 1000 Ft. AGL @ Full Optical Zoom
Sample Down-Linked Video
~ 3000 Ft. AGL Tracking an Object