



Micro Tech CoroCam Air PLI 280 Asset Management Program



Airborne Power Line Inspection CoroCam Air (PLI280)

- Prepared by: Pieter van Jaarsveld
Jacques Theron
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Scenario:

- Power lines and their associated servitudes are long distance features that requires structured and repeatable management approaches
- A key component in this process is collection of condition data in a *cost effective and repeatable manner*
- This condition data consist of a complex arrangement of information, spread over large distances
- The information needs to be collected, *stored and managed in an accessible and repeatable manner*
- Examples of relevant data is video imagery, high resolution still imagery, UV imagery, infra red imagery and spatial data
- With the source data available, reporting is required to reduce this data to an *accessible and manageable format*

Approach:

- Airborne to cover distances at speed and without terrain limitation
- Stabilized and steerable and protected sensor suite to improve view and remove airframe dynamics from the sensor line of sight
- Sensors in order of importance is HD color video, high resolution photogrammetric still, UV and thermal imager
- Image information excluding still is fused as a single display, providing overview of all information to the operator
- Information is recorded with spatial information (position, orientation and time) embedded
- Post processing automatically links information to spatial position, to form the backdrop for reporting
- Reports are thus linked to spatial position, with all the supporting imagery interactively available

Implementation:

Simple architecture consisting of:

- Gimbal with sensors
- Laptop gimbal and sensor controller
- High definition display
- High definition recorder
- Post processing and reporting PC and software.

Features:

- 4 axis light weight, non ITAR, purpose designed, stabilized payload system
- Highly transportable and easy to mount
- High resolution photogrammetric color stills
- HD video imagery
- UV sensor option
- Radiometric infrared sensor option
- Multi-spectral image fusion
- Spatial referencing on all imagery
- Interactive imagery / position display and reporting environment

Operational Approach:

- The system is configured to supply maximum information, with minimum operator input
- All sensors, except the HD day are focused at infinity, to simplify
- All sensor information (except still) is fused into a single image, to provide maximum identification capability
- Information is recorded with integrated spatial information, making it possible to automatically relate imagery to position and time
- The operator will steer the line of sight to view objects of interest. On the HD day image the filtered UV and filtered IR information is super imposed
- This queues the operator towards possible problem areas. The HD zoom camera can then be controlled to look at detail
- The photogrammetric still camera provides overview and servitude information
- Object positions can be determined through still imagery

Airborne Hardware



Multi Sensor Gimbal



Monitor



Laptop Controller



Recorder

Specifications

<h2>Sensors</h2>	<h3>Day</h3> <p>Sony FCB-H11 1920 x 1080 pixels 16 : 9 aspect ratio Spatial resolution 1.2 mm @ 30 m 5.1 to 51 mm zoom 4.4 x 2.5^o Narrow 42 x 24^o Wide</p>	<h3>Still</h3> <p>Canon EOS 550D 18 mega pixel 5184 x 3456 pixels 35 mm lens 35 x 24^o field of view Spatial resolution 3.6 mm @ 30 m 18 m minimum focus distance</p>	<h3>Ultra Violet</h3> <p>Uvirco CoroCAM 504 core 8 x 5.5^o field of view 20 m minimum focus distance</p>	<h3>Infra Red</h3> <p>Thermoteknix Miricle 307 8 - 12 μm micro bolometer 640 x 480 pixels 50 mm focal length 18.2 x 13.7^o field of view Spatial resolution 15 mm @ 30 m</p>
<h2>Gimbal System</h2>	<h3>Gimbal</h3> <p>280 mm diameter < 22 kg mass + 10^o to - 140^o elevation freedom 360^o continuous azimuth freedom < 15 μrad rms stabilization Optical serial digital output Onboard digital excitation and control 150 knots maximum speed - 10 to + 45^o C operating temperature</p>	<h3>Laptop Controller</h3> <p>Converted to HD-SDI 1080 50i Contains spacial information</p>	<h3>Monitor</h3> <p>JVC BT-LH1710 16:9 aspect ratio HD-SDI input</p>	<h3>Recorder</h3> <p>Client furnished</p>

Conclusion:

- The complexity, data quantity and reporting requirements demands a purpose specific implementation, mechanizing repeatable data collection and reporting, from a airborne platform
- The PLI280 provides an operational cost-effective solution, through high levels of integration, combined with small size and low mass

Corona Detection & P.D.

- Broken or damaged strands
- Damaged insulator discs
- Spark gaps on loose clamp
- Pollution, conductors, insulators
- Missing or damaged rings
- Incorrect arc horns
- Flash-over paths
- Sharp hardware protrusions
- Corroded conductors
- Power loss
- Environmental Pollution

