Applications of Unmanned Air Vehicle (UAV) Systems for Remediation Projects

Greg Lewis • Matrix Solutions Inc.

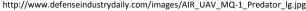# Presentation Overview

- Why use a UAV?

- Current UAV systems

- Applications
  - Colour imagery
  - Three dimensional model
  - Near Infrared imagery / Vegetation Index

- Considerations for implementation

- Future developments

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What is a UAV?

- **Unmanned Aerial Vehicle**

- Any fixed or rotary winged aircraft which does not carry any human cargo
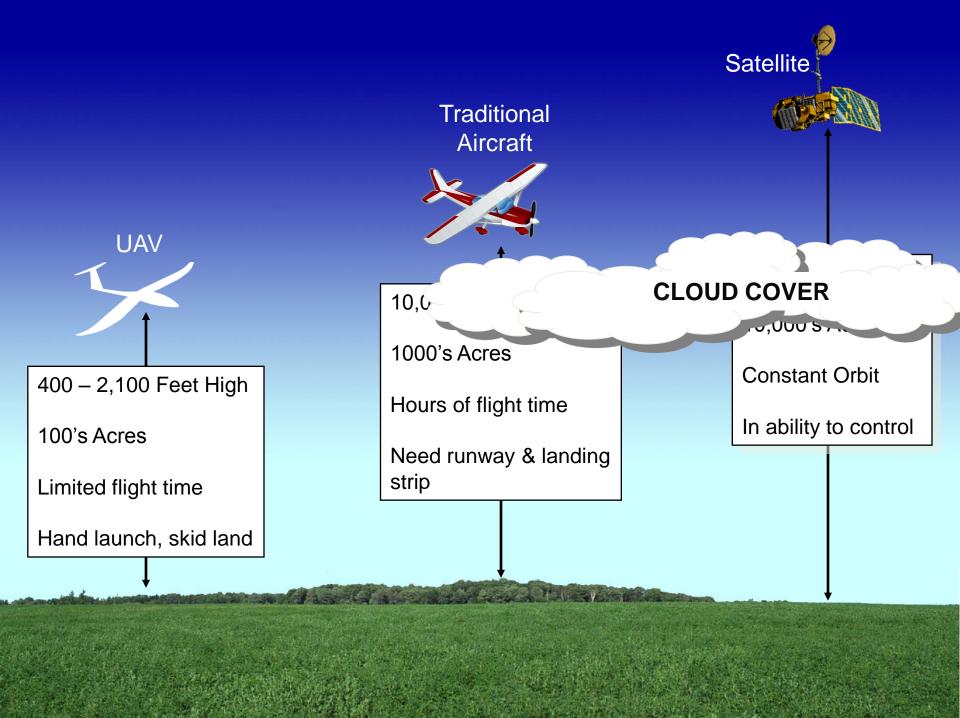
- Traditionally only used in the military

http://www.defenseindustrydaily.com/images/AIR_UAV_MQ-1_Predator_lg.jpg

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Why Use a UAV?

- Quick and flexible data collection

- High resolution georeferenced imagery

- Custom sensors

- Accurate, timely imagery = better decisions

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UAV

Traditional
Aircraft

Satellite

CLOUD COVER

400 – 2,100 Feet High

100's Acres

Limited flight time

Hand launch, skid land

10,0

1000's Acres

Hours of flight time

Need runway & landing
strip

10,000's A

Constant Orbit

In ability to control

UAV Imagery (12.5 cm)

Landsat Imagery (30 m)

Current Platforms
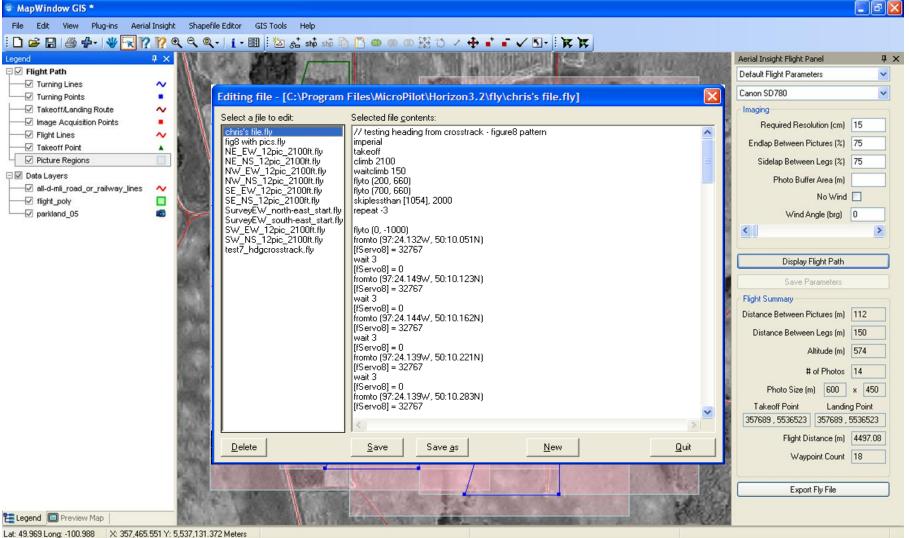
Fixed Wing

Rotatory Wing

Flight Management
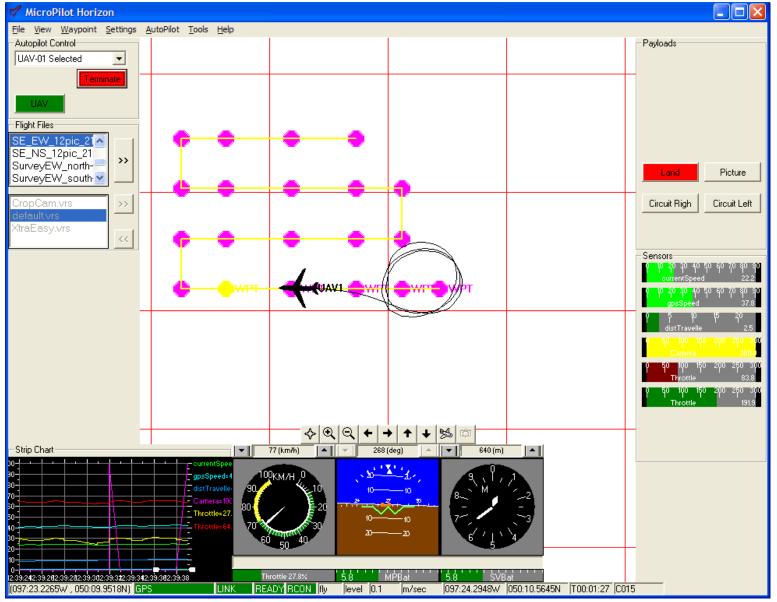
Ground Control

Flight Path
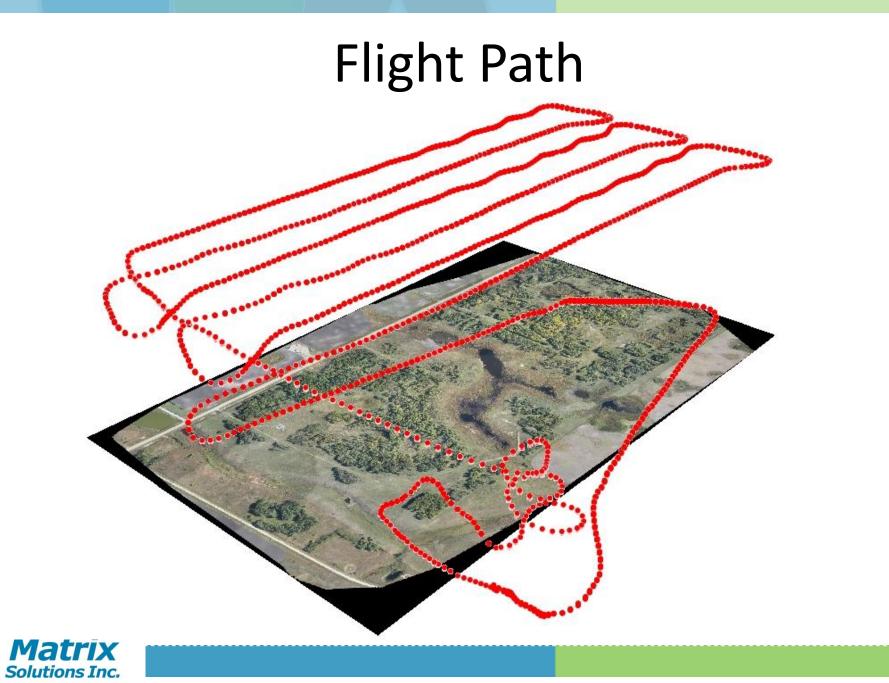
Image Processing

- Images from camera and log file of flight from autopilot are matched

- Allows for the automated creation of a seamless georeferenced image mosaic

- Creation of a high resolution 3D digital model

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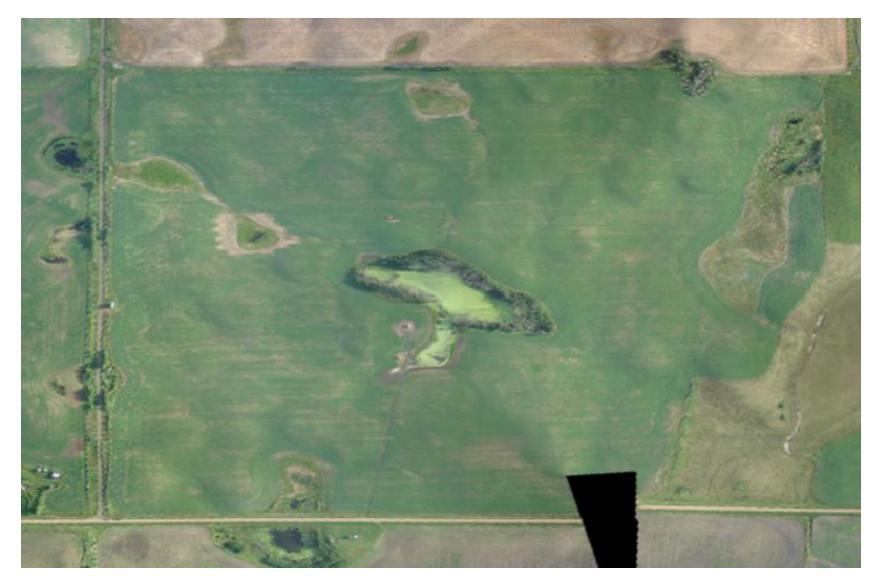ENVIRONMENT & ENGINEERING
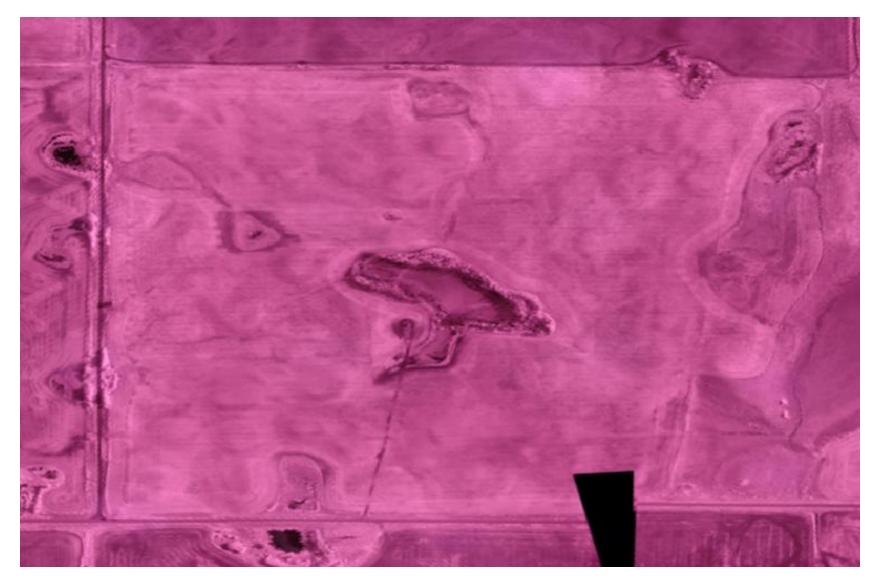
Flight Path

Near Infrared / NDVI

- Near infrared is highly reflected by biomass

- NDVI – biomass index that is normalized to reduce variation in the reflectance in the imagery
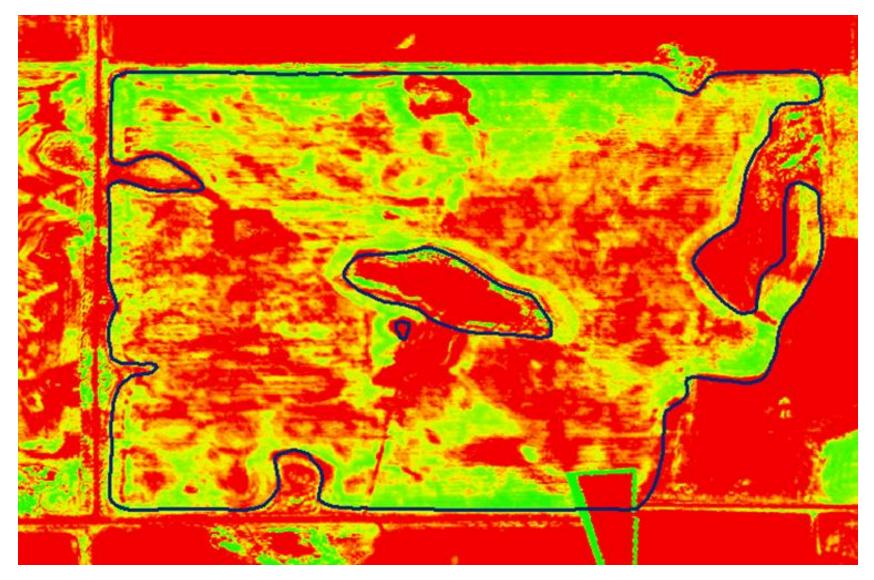
Considerations

- Size of the area to be flown, must be scale appropriate

- Transport Canada requirements (SFOC)

- Training of personal to operate

Future Developments

- Developing a stabilized "geoenabled" camera pod

- New payloads to specific wavelengths and applications

- Continue refinement of 3D modeling and validation of accuracy