AARIS - Automated Airborne Remote Information System

• Automated
  • Low Cost
  • Quick Turn

• Airborne Remote
  • Vertical Color Digital Images
  • 0.25 to 2 m/pixel

• Information System
  • Orthorectified/Georeferenced Images
  • Database Files for Images to Ease Use and Cataloging
  • No Copyrights
    • Use each image for multiple uses without restriction
AARIS - Automated Airborne Remote Information System

• **History**
  • Initial use 1997 with film camera
  • Converted to digital camera 2002
  • In process to add GYRO and full automation

• **Users**
  • ODA (1999, 2001)
  • EPA (2000)

• **Future**
  • Seek niches where AARIS is appropriate
Remote Sensed Data Acquisition Process

- Gather Stream Coordinates
- Acquire Images
- Rectify Images
- Classify Images
Converting 3D to Accurate 2D Images

Airborne Camera

Equal sized objects at different ground elevations

Ground Elevation
Converting to Orthorectified and Georeferenced Images
Using Rectified Images with GIS Layers

Ground Cover Type Layer

Ground Cover Type Layer

Road Layer

Digital Image Layer

AARIS
Manual or Automatic Rectification

Manual Approach
GCPs
or
Diff Rect

Automatic Approach
Airborne
GYRO

OR

Gather Stream Coordinates

Acquire Images

Rectify Images

Classify Images
AARIS Components

- Coordinates
- MAARIS
- AARIS
- PAARIS
- Erdas Orthobase
- DAARIS
- GeoTIFF Image Database

Required Data:
- ESR Components
- Existing Data
- Existing Software
- Future Components
Preflight Planning

1) Supplied coordinates define site location.
2) DEMs supply site ground elevation.
3) MAARIS is a graphical map program that simplifies flight planning.
4) MAARIS provides flight plan data to AARIS.

MAARIS
Map software for preflight planning.
MAARIS Flight Plan Screen
Airborne Data Acquisition

AARIS
Automated Airborne Remote Information System

PAARIS
Post flight software to reformat data and prepare it for the next steps.

1) Load flight plan data.
2) Conduct flight acquiring images and all sensor data.
3) Download all data and images from aircraft and post process to prepare for next steps.
AARIS System in Aircraft
Post Flight Processing Options

GAARIS
Gyro data post processing to convert data from POS PAC to what Erdas Orthobase requires.

DAARIS
Database creation software.

Required Data  
ESR Components  
Existing Data  
Existing Software  
Future Components
Using Ground Control Points

1) Ground control points (GCP) are acquired.
2) GCPs are identified on each image.
3) Erdas Orthobase is used to orthorectify and georeference each image.
4) DAARIS is used to create a database file that includes information about each image to ease image and data management.
Using Differential Image Rectification

1) Load appropriate differential rectification image.

2) Identify GCPs on each acquired image and reference image.

3) Erdas Orthobase is used to orthorectify and georeference each image.

4) DAARIS is used to create a database file that includes information about each image to ease image and data management.
Automated Direct Georeference

1) Erdas Orthobase is used to orthorectify and georeference each image based on gyro data and DEMs.

2) DAARIS is used to create a database file that includes information about each image to ease image and data management.
## Comparison of Rectification Options

<table>
<thead>
<tr>
<th>Rectification Option</th>
<th>PROS</th>
<th>CONS</th>
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<tbody>
<tr>
<td>Ground Control Points</td>
<td>Low initial cost</td>
<td>Very expensive per image</td>
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<tr>
<td></td>
<td></td>
<td>CGPs</td>
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<td></td>
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<td>Manual operation</td>
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<td></td>
<td>Very long turn around</td>
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<td>Differential Rectification</td>
<td>Low initial cost</td>
<td>Expensive per image</td>
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<td></td>
<td></td>
<td>Manual operation</td>
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<tr>
<td></td>
<td></td>
<td>Long turn around</td>
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<tr>
<td>Direct Georeference</td>
<td>Low cost per image</td>
<td>High initial cost to setup</td>
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<tr>
<td></td>
<td>Quick turn around</td>
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</tbody>
</table>
AARIS Components

- DEMs
- MAARIS
- GAARIS
- Fixed GPS (CORS)
- Applanix POS PAC
- Digital Camera
- GPS
- Pilot Interface
- GYRO
- AARIS
- PAARIS
- Erdas Orthobase
- DAARIS
- GeoTIFF Image Database
- VegMeasure
- GIS
- Other Processing

Legend:
- Required Data
- ESR Components
- Existing Data
- Existing Software
- Future Components

AARIS
AARIS - Automated Airborne Remote Information System

• Tune System to Fit Specific Applications
• Low Cost
• High Quality
• Quick Turn Around
• Easy To Use Database File
• No Copyright, No Restrictions
• Pay Only When Images Are Delivered