

The link between technology advancements and effective water conservation

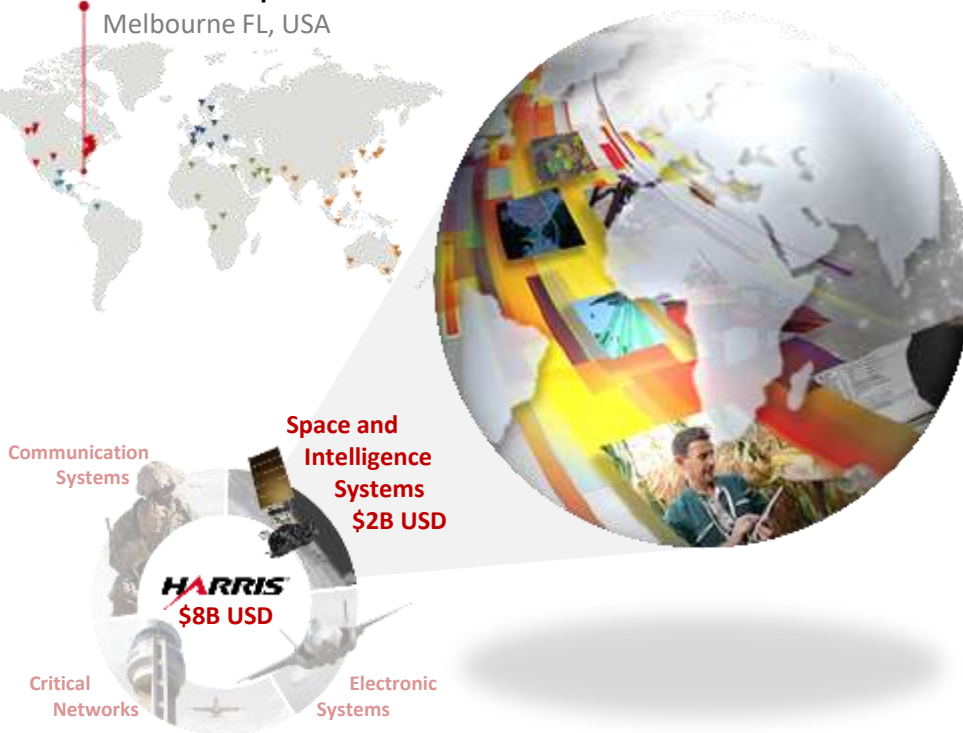
John Shopf

APAC Global Business Development Manager

Harris has been providing global commercial Geospatial Solutions for over 20 years

Global Headquarters

Melbourne FL, USA



Harris Geospatial Solutions

- Digital Elevation Models
- 2D Imagery Products
- 3D Urban Models
- Vector Feature Extraction
- Multispectral Classification

Harris has been a leading solutions provider in India



Headquarters in New Delhi

- Defence
- Public Safety
- Air Traffic Management
- Geospatial Services
- Environmental Solutions



Geographic Information System data increases the effectiveness of water conservation efforts

Watershed Management

- Develop policies and practices
- Protect and Improve
- Water supplies & natural resources

Geographic Information System

- Collect, analyze, and interpret data
- Verify previous activities
- Understand interactions & trends
- Provide robust predictions



Flooding



Water Pollution



Erosion

Water conservation requires a comprehensive understanding of the watershed environment

Example River Basin Coverage



Linear Mode
LiDAR

Geiger Mode
LiDAR

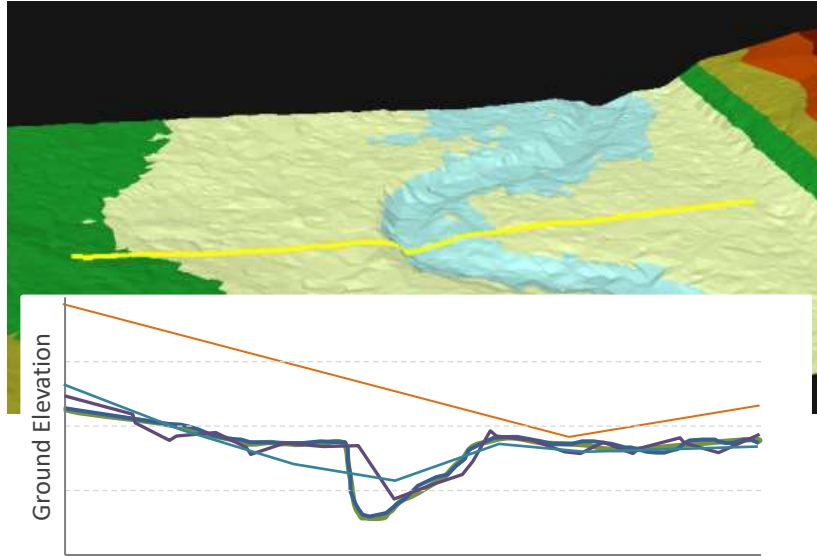
Nearly 10x the coverage area for similar flight operations

- Affordable wide area solutions
- Accurate “bare earth” terrain data

- Comprehensive measurement, predication and planning
- Increase the health of the entire watershed rather than isolate areas

Sub-Catchment behavior has a big impact on the overall health of a watershed

Sub-Catchment: 8ppm² Required for Flood Mapping



Note: 4m = 1ppm²

30m 10m 4m 8ppm² Actual

Nearly 5x the resolution for similar cost

- Sub-catchment understanding
- Accurate flow modeling *within* the watershed


- Flash flood prevention caused manmade efforts
- Isolation of polluted runoff
- Effective anti-erosion remediation

Higher data accuracies result in more effective hydraulic modeling, prediction and verification

High Precision Vertical Accuracies Allow Accurate Flood Modeling



- Greater vertical accuracy
- Elimination of inherent errors

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- Verification of remediation efforts
 - Adequate sizing of polluted catchment resources
 - Accurate erosion prediction

Harris flood plane mapping and prediction services

Harris Geiger Mode LiDAR Collection Benefits



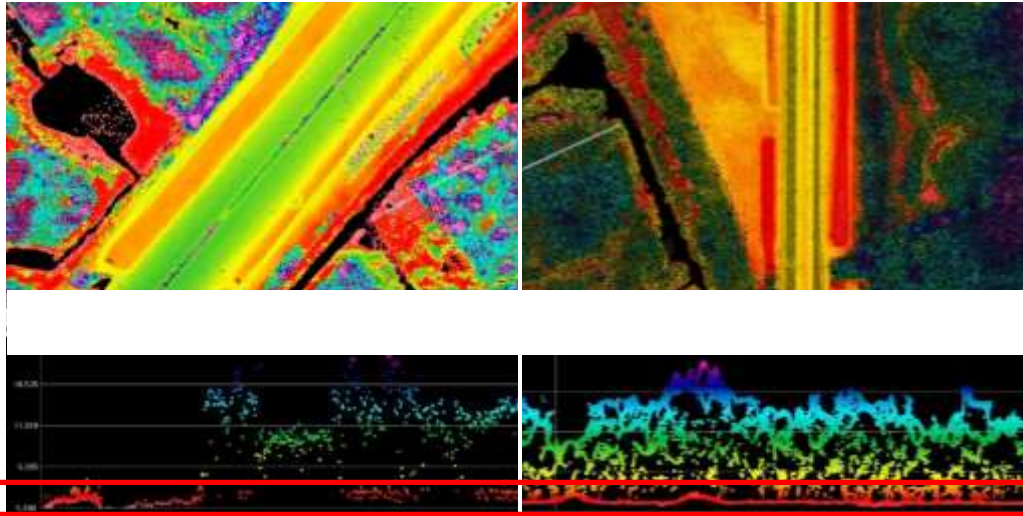
- Rapid wide area collection
- Foliage penetration
- High resolution
- Vertical accuracy
- 360° viewing angles
- Automated production

Affordable wide area collection

Harris Geiger Mode LiDAR

LM LiDAR at 3,2k AGL

Harris GM LiDAR at 12k AGL



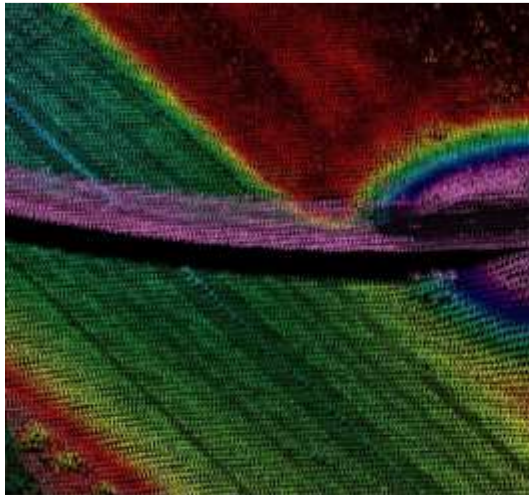
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Limited foliage penetration...

...visible bare earth.

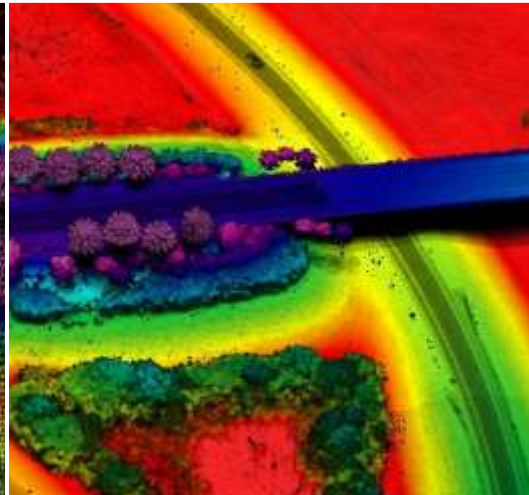
Harris Geiger Mode LiDAR

LM LiDAR at 3,2k AGL



Limited detail with data gaps...

Harris GM LiDAR at 12k AGL



...comprehensive detail

- Rapid wide area collection
- Foliage penetration
- High resolution
- Vertical accuracy
- 360° viewing angles
- Automated production

Flood Plain Risk Analysis Model



Courtesy of ESP & Associates

- Rapid wide area collection
- Foliage penetration
- High resolution
- Vertical accuracy
- 360° viewing angles
- Automated production

Understand the potential risk for wide areas

Harris Geiger Mode LiDAR Collection Benefits

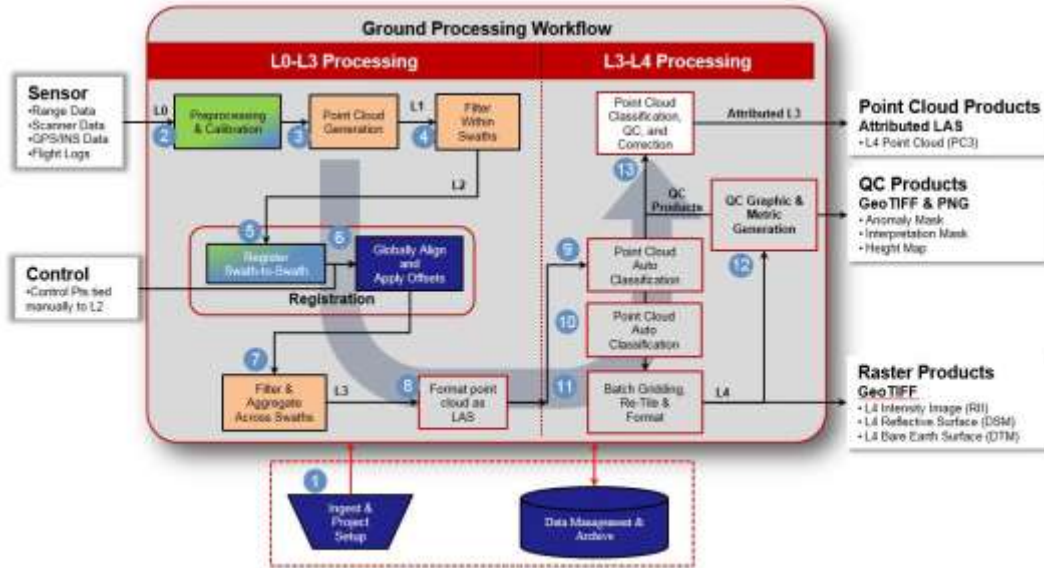


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Affordable wide area collection

Harris Geiger Mode LiDAR

Harris Enterprise Data Production

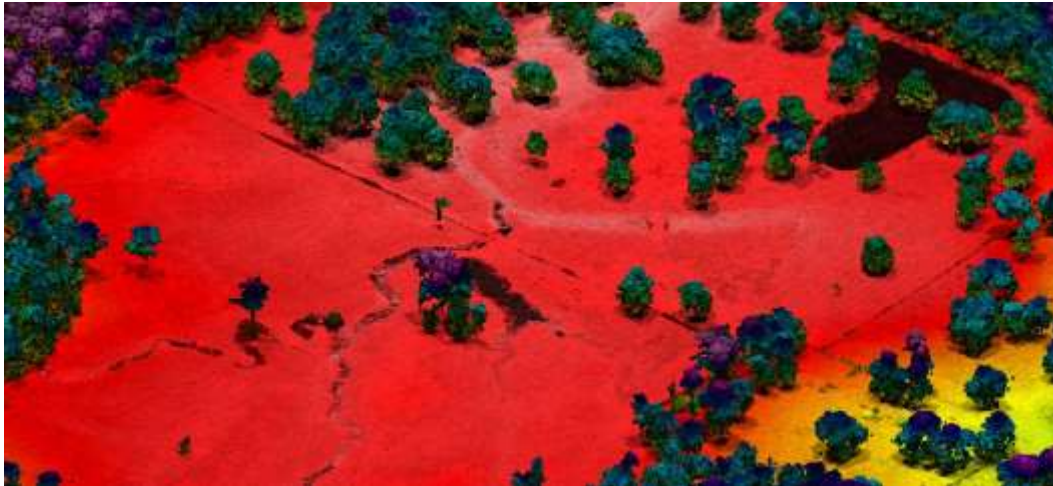


- Rapid wide area collection
- Foliage penetration
- High resolution
- Vertical accuracy
- 360° viewing angles
- Automated production

High volume multi-core Linux grid environment

Thank You

Harris Geiger Mode LiDAR 17k AGL



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Fine drainage detail visible