



Surdex Presentation

HGAC-GIS-2011-3-002

01 June, 2011



Randy Burkham, VP Customer Solutions, Houston TX
Wade Williams, CP Project Manager
Randy Mayden, Business Development



Suredex H-GAC Presentation

About Suredex

- Approximately 100 employees
- Current annual revenue of ~\$20M
 - Financially sound
- Over a half-century of operation (1954)
 - Aerial acquisition – film, digital, LiDAR
 - Surveying
 - Aerotriangulation
 - Orthophoto production
 - Planimetric & topographic mapping
 - GIS services
- **All production operations based in Chesterfield, MO**



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About Suredex

■ Clientele

- Local government/COG's
- State government (DOT, DNR, statewide, etc.)
- Federal government (USDA, USACE, NGA, FEMA, etc.)
- Oil & Gas

■ Personnel

- Extremely low turnover rate – long-term employees
- Numerous with advanced degrees
- 13 Certified Photogrammetrists
- Registered Engineers
- Registered Land Surveyors



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About Suredex

- Dedicated R&D staff to improve performance, quality, and cost-effectiveness
 - Algorithm and process development
 - Hardware and software integration and development
- Key resources
 - 9 aircraft – hangar & in-house inspection, maintenance, & repair
 - 4 digital sensors (3 DMC, 1UCX/Wa), 4 film cameras, 1 LiDAR
 - 30+ softcopy workstations, including stereoscopic
 - 200+TB of on-line storage



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Management Approach

- Suredex's Project Manager (Wade Williams)
 - Reports to business development manager
 - Required to contact clients at least once a week
- Sharing Information electronically or paper
 - Real-time status via web interface
 - Process-specific reports (acquisition, survey, etc.)
 - Weekly status from the project manager
- Effective communication
 - Voice and face-to-face interaction
 - Kick-off meeting
 - Teleconferences
 - On-site visits (if desired)

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Project Management Philosophy

- Problems *will* arise – success is achieved by addressing them promptly and correctly
- Keys to dealing with issues
 - Consistent flow of information
 - Regular communication
 - Face-to-face if required
 - Immediate action
- Single point of contact with H-GAC – the Suredex Project Manager



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H-GAC Project Management Team

Tim Bohn, CP

Director, Project Management

Wade Williams, CP

Project Manager

Jon Noirfalise

Flight Manager, Chief Pilot
10 Pilots / Camera operators

Steve Kasten, CP

Survey Manager
Field Survey Crews

Larry Stolte, CP

AT Manager
2 AT Technicians

Randy Hoffmann, CP

Stereo Compilation
Manager
14 Stereo Compilation
Technicians

Brad Barker

Cartographic
Finishing Manager
5 Finishing Technicians

Adam Hoffmann

Orthophotography
Manager
4 Orthophoto Technicians



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Wade Williams – Project Manager

- B.S in Geography and Cartography
- 15 years with Suredex Corporation
- ASPRS Certified Photogrammetrist
- Production positions prior to project management
 - Former manager of Ortho Department
- Project manager since 2002
 - Supervised over \$4M in work in 2010
 - Numerous local government projects

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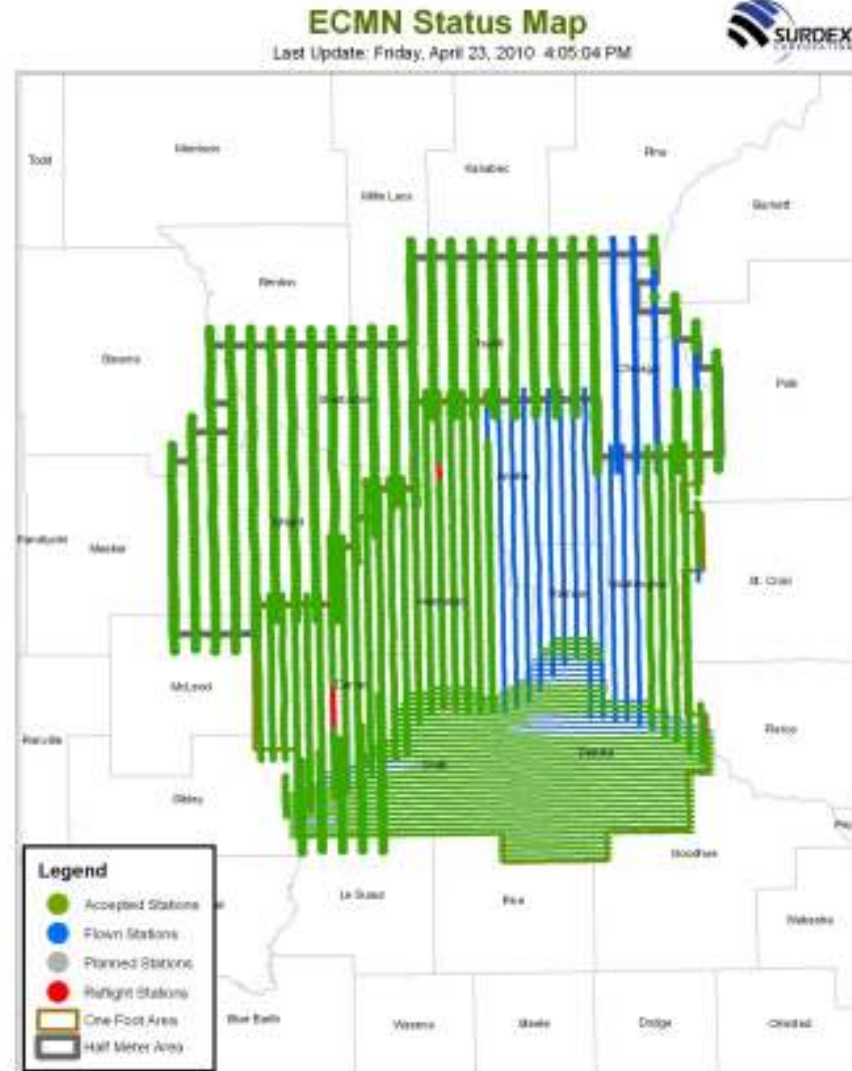
Technical Approach

- Project design
- Ground survey
- Acquisition
- Image inspection
- Image processing
- Aerotriangulation (AT)
- DTM update
- Orthorectification/mosaicking
- Quality control



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**Web-Based,
Project-Specific
Status**





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Flight Design Parameters

- Full stereoscopic coverage
 - 60% forward lap, 30% sidelap
 - 50% sidelap lateral to project area
 - Two additional models each end of flight line
 - 80% forward lap, 60% sidelap for reduced building lean
 - Additional flights in downtown areas

- Flying heights (specific to DMC)
 - The imagery at 3" resolution will be flown at ~2,400' AGL.
 - The imagery at 6" resolution will be flown at ~4,800' AGL.
 - The imagery at 1' resolution will be flown at ~9,600' AGL.
 - The imagery at 2' resolution will be flown at ~19,200' AGL.



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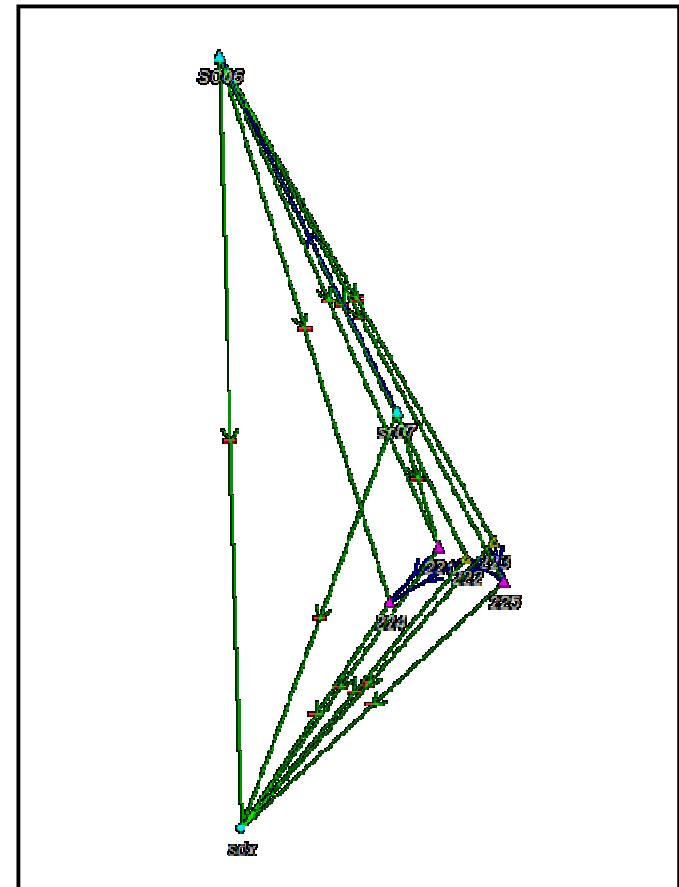
Resource Requirements

- Suredex owns 3 DMC Sensors installed in Conquest II aircraft with multiple air crews
 - Gross capture rate of 4,500 to 6,000 frames per day (6")
 - Late December~early February; low sun angle in north latitudes, ideal for southern states
 - Currently, only Collier Florida is committed for Dec/Jan flight.
 - ~11-16 acquisition hours

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Ground Control Survey

- Paneling of existing control as required
- Additional points as required
 - Full GPS survey tie to existing network
 - New control to be provided to H-GAC
 - 3"; ~1 pt. every 4 sq. mi.
 - 6"; ~1 pt. every 25 sq. mi.
 - 1'; ~1 pt. every 50 sq. mi.
 - 2'; ~1 pt. every 67 sq. mi.





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Suredex Image Processing Approach

- Proprietary approach perfected over last 6 years
- Establishes “colorimetry” ***before*** ortho production starts
 - Reference images from initial acquisition
 - Engage H-GAC in determining appearance
 - All images targeted at agreed-upon reference image

- Why this approach?
 - reference images will match product
 - Virtually no color balancing required during production
 - Reduces QC to focus on accuracy and seamline errors

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Suredex Image Processing Flow

- Images grouped into large blocks for Gamma correction
 - Common characteristics
 - Initial targeting of image appearance
- Solar correction (“hot spot” removal)
 - Offset solar illumination
 - Not often required for high-resolution imagery
- Digital dodging
 - Offset atmospheric haze
 - Offset localized brightness/contrast variations
- Full 12 bpp processing
 - Option to output in 8 bpp at completion

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Suredex Image Processing Flow



Uncorrected
12-bit Raw Image

Competition Sensitive

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Surdex Image Processing Flow



**Initial Gamma
Correction**

Competition Sensitive

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Surdex Image Processing Flow



Solar Correction

Competition Sensitive

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Suredex Image Processing Flow



Digital Dodging

Competition Sensitive



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Pre-Production vs. Final Product

2008 NAIP, Twin Cities, MN
~1,200 square miles



Competition Sensitive

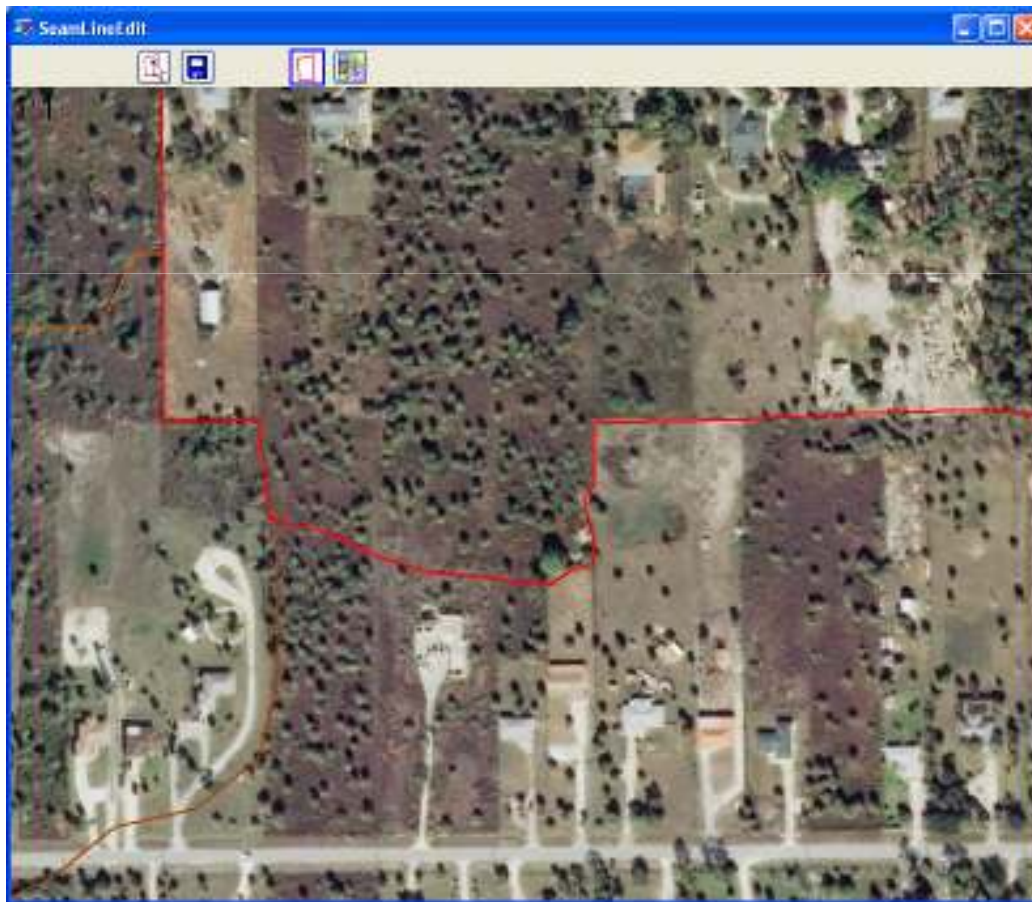
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Orthorectification

- Proprietary Suredex software
 - Multi-threaded in distributed processing environment
 - Includes analysis of smearing and occlusion in rough terrain
 - Automated check of AT points against terrain model to isolate possible DTM errors
- “Neat orthos” with minimum overlap
 - Reduce building/feature lean
 - Increase image quality
 - Increase accuracy – reduced geometry problems
- Automatically run after AT is complete

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Automated Seamlines With Interactive Edit



- Full control of process
- Easy to QC
- Before-after interface
- Feathering
- Shapefiles delivered to H-GAC
- Sensor serial number & date of acquisition for every pixel/polygon



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On-Line Client QC Tool

- Suredex offers web-based tool for use by H-GAC
 - Data resides at Suredex
 - Corrections made based on H-GAC inspection
 - Delivery after validated corrections
- CPAT – Client Product Acceptance Tool
 - ESRI ImageServer piped through a web browser
 - Seamless roam of image data
 - Overlays (tile layout, seamlines, etc.)
 - Client ability to overlay graphics
 - Tracking of shipping, acceptance, correction dates
 - Robust statistics

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CPAT Red-Lining



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Seamline Guide QC



Metadata Table:

id	Added Date	User Name	Adding Type	Offline Description	Active Status
1	8/10/2009 11:08:38 AM	jean	Clouds Or Cloud Shadow		0
2	8/10/2009 11:46:24 AM	jean	Image Description		0
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Schedule

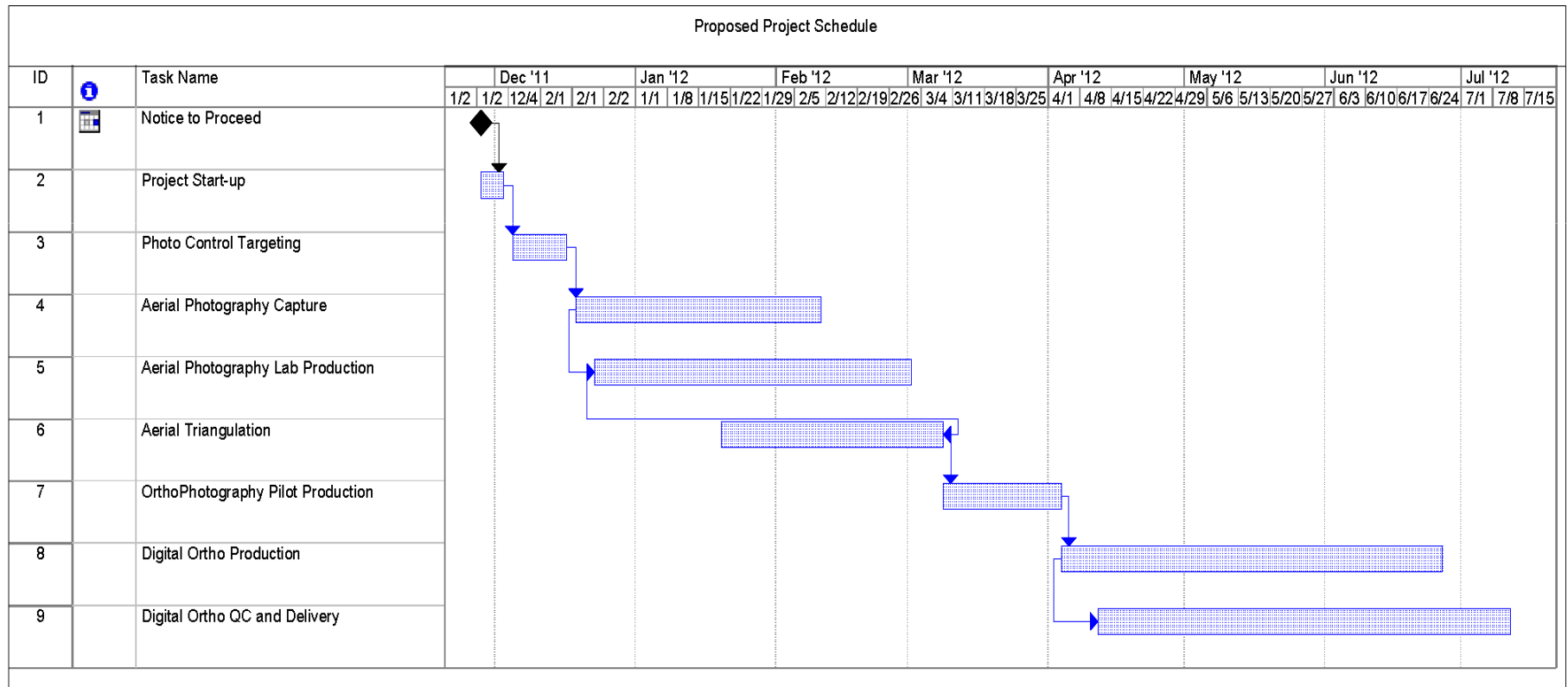
Remote Sensing Data Appendix F: Proposed Delivery Schedule

Project Milestones	Time Frame
Project Staging	August through October, 2011
Imagery Acquisition Range	December 2011 through January 2012
4 Samples Provided to H-GAC (digital and hard copy)	March 1, 2012
Schedule of Phased Delivery of TIFFs	April 1 through June 1, 2012 (depending on size of award)
Final Delivery of TIFFs	June 30, 2012 (depending on size of award)
Final Delivery Dates of Compressed Data	July 15, 2012 (depending on size of award)



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Schedule



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12 inch resolution; Houston TX, March 2011



Competition Sensitive

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6 inch resolution; Houston TX, March 2011



Competition Sensitive

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3 inch resolution; Houston TX, March 2011



Competition Sensitive

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Questions...



Answers...