HEXAGON
empowering an autonomous future

Idaho Imagery Technical Working Group Meeting

Rob Eadie

November 1, 2023

Our businesses each play a unique role in contributing to our mission and vision and driving sustainable value creation

Manufacturing Intelligence

Converging design and engineering, production and metrology solutions to enable smart factories for digital transformation.

Asset Lifecycle Intelligence

Transforming unorganised information into smart digital assets to visualise, build and manage structures and facilities.

Autonomy & Positioning

Pioneering end-to-end solutions for assured positioning and correction for land, sea and air.

Mining

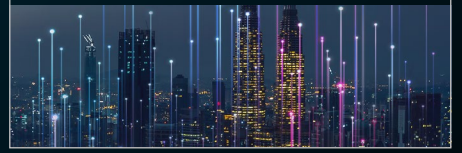
Solving the toughest surface and underground challenges with proven technologies for planning, operations and safety.

Agriculture

Enabling better planning, efficient execution, precise machine controls and automated workflows with advanced technologies.

Xalt Solutions

Accelerating digital transformation by solving workplace challenges with the industry's most agile framework.



Geospatial

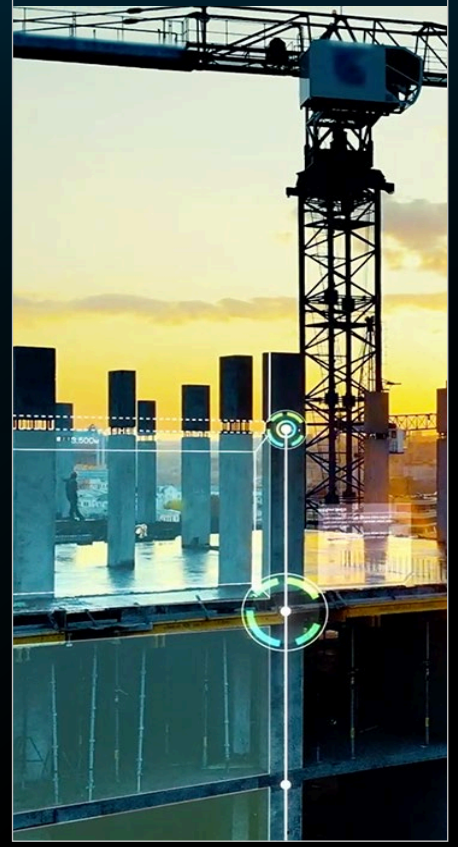
Delivering 5D smart digital worlds with location intelligence that conveys what was, is, could be, should be and will be.

Safety & Infrastructure

Improving the performance, efficiency and resilience of vital services with software solutions for smart and safe cities.

Geosystems

Creating smart digital realities from different views with powerful technologies that capture, measure and visualise data.



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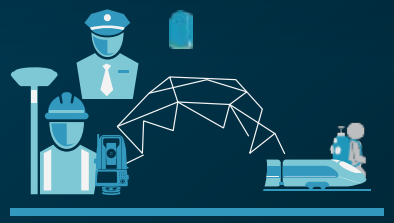
Hexagon’s Geosystems division

Surveying

Helps surveyors be more efficient and provides innovate workflows to meet client's needs with fewer resources.



Building

Creates value for the building industry by delivering a portfolio of information, collaboration and visualisation technologies.

Heavy Construction

Helps contractors win, execute and complete more work on time, on budget and on specification.

Mining

Creates safer, more productive mines by delivering integrated life-of-mine solutions that optimise design, planning and operations.

Geospatial Content

Provides access to innovative airborne sensing technology and high-quality geospatial data to various industries.

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HxGN Content Program

The largest library of high-resolution aerial imagery, elevation data, 3D models and analytics across North America and Europe.

The aerial data is orthorectified, accurate and available at multiple resolutions.

Seattle, Washington, US

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10 years of continuous data collection

2014

Start of U.S. data program at 30 cm resolution.

11 states captured in the first season including Texas and California.

2015

20 new U.S. states captured.

Start of European data program at 30 cm resolution.

Captured Italy, Portugal, Denmark and most of Spain.

2016

Start of U.S. urban program at 15 cm resolution.

Includes all U.S. cities above 50k population, making this the largest urban data acquisition year to date at 225 cities.

31,112 km² total area captured.

2017

First cycle of continental coverage in the U.S. completed with 20 states refreshed.

2018

Our biggest year in history. Refreshed half the continental U.S. and a third of European coverage in one season.

5,123,779 km² total area captured.

GSA

Availability of the data through GSA schedule.

2019

aws

Content hosting migrated to AWS in North America and Europe

HD

Start of Metro HD city program acquisition in the U.S.

USDA

16th consecutive year of collection for NAIP, now at 60 cm resolution.

2020

Start of U.S. data collection at 15 cm resolution. Third U.S. refresh cycle.

Completion of European coverage.

2021

16 states refreshed in the U.S.

Start of European city program at 5 cm resolution.

2022

9 states refreshed in the U.S.

Commitment to 15 cm statewide collection.

HD

Start of Metro HD city program acquisition in the U.S.

HxDR

Orthoimagery available on Hexagon's Digital Reality

2023

13 states to be refreshed in the U.S. at 15 cm resolution.

HxDR

Metro HD city data available on Hexagon's Digital Reality

30 cm resolution program

15 cm resolution program

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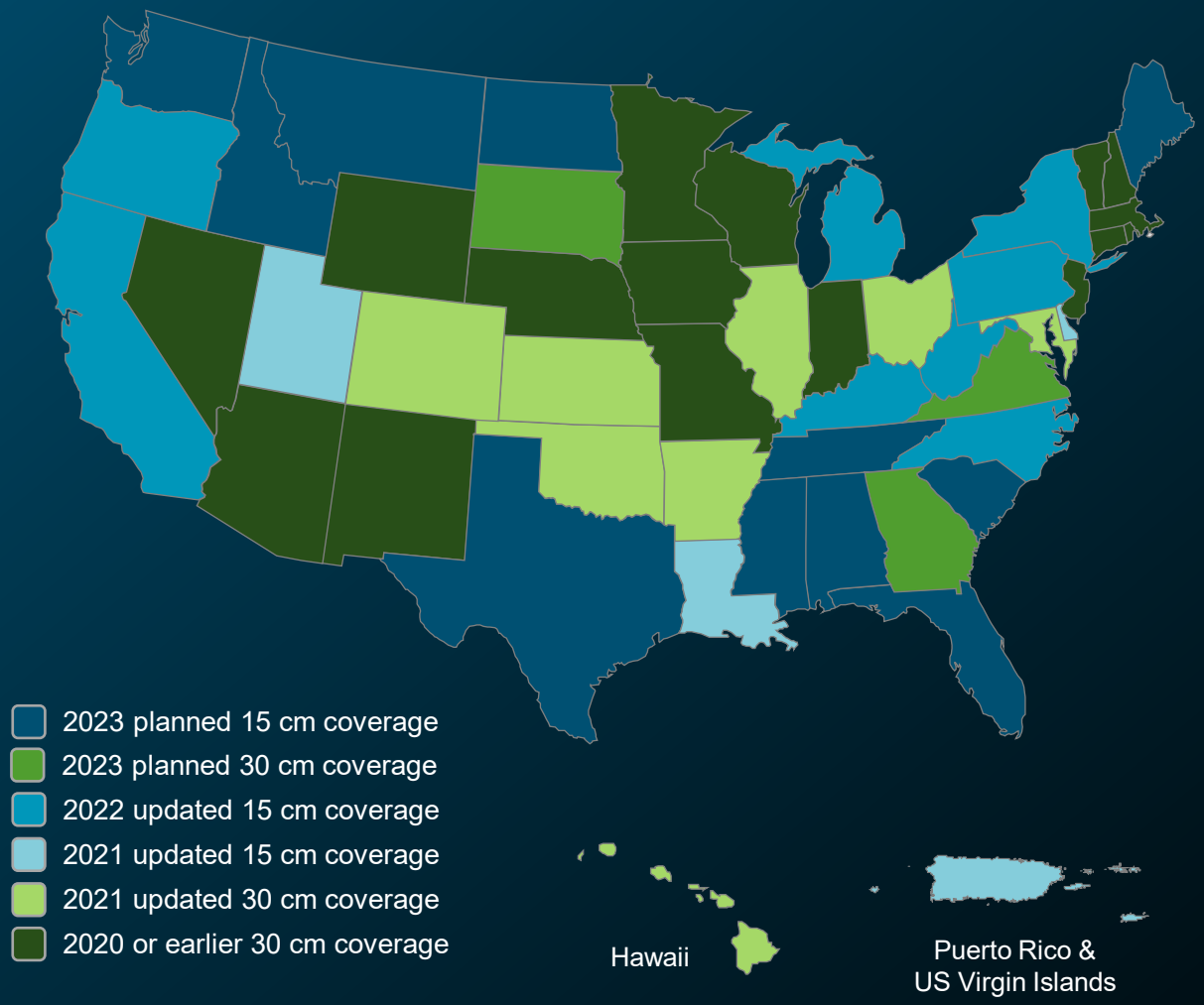
United States coverage map



100%
complete coverage of contiguous United States

8,052,144 mi²
total 30 cm resolution coverage

1,601,311 mi²
total 15 cm resolution coverage

2022 Refreshed Data

657,337 mi²
updated data

10
updated states

2023 Planned Collection

1,150,677 mi²
planned collection

14
planned states

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HxGN Content Program's ecosystem

FLEET

20-30
planes flown per year

DATA

>2 PB
raw data collected in 2022

1 BILLION
images streamed per month

2500+
CPU cores

100 GB
network speed

22 PB
working storage

PRODUCTION

19+ MILLION
square miles of data processed since 2014

PARTNERS

32
authorized resellers

5+
acquisition partners

7
processing teams

HEXAGON

Serving various industries and applications

Government

Utilities

Telecommunications

Transportation

Insurance

Public Safety

Environmental

Automotive

Exceptional consistency over large areas makes our data ideal for large-volume analytics, feature extraction and training machine learning algorithms.

We provide for applications such as urban planning, asset management, public safety, utility mapping, app development, and many more.

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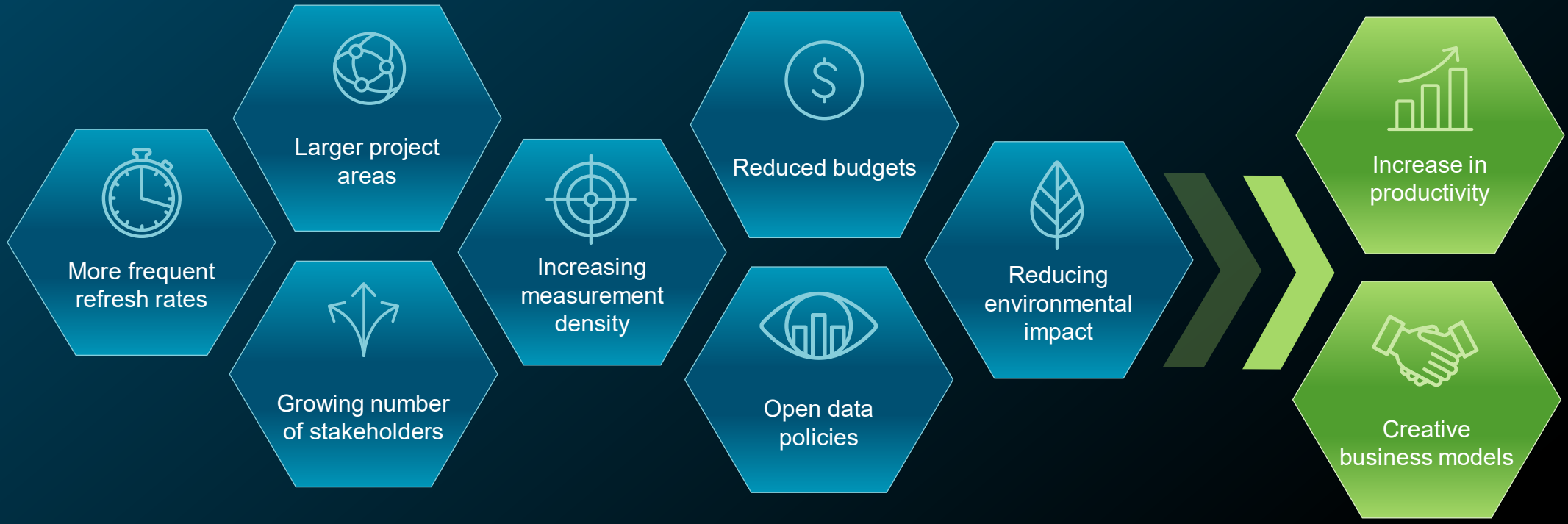
Geospatial industry trends

Current and emerging observations and response



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Derive valuable insights with high-quality aerial data

Highly accurate & consistent

Our data is captured using high-performance sensors and processed using ground control and rigorous QA/QC routines that emphasize data accuracy and clarity.

Reliable refresh cycle

We capture data in the same season according to planned refresh schedules, allowing you to budget and prepare in advance.

Comprehensive

As the world's largest aerial data provider, we offer a full stack of high-resolution 2D and 3D data sets to enable you to make well-informed decisions.

Machine learning ready

Exceptional data consistency over large areas makes our data sets ideal for training machine learning algorithms.

Immediate data access

Deploy quickly with on-demand cloud streaming or pixel download. Multiple consumption models ensure smooth integration with existing workflows.

Flexible use terms

Flexible data use terms allow users to build derivative products, analytics, and value-added layers.

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Licensed off-the-shelf statewide aerial data

- Leaf-on, 4-band orthoimagery of the United States & Western Europe
- 15 cm resolution statewide in the US
- 3-year refresh schedule
- Variety of 2D and 3D aerial data products
- Eliminate the need for IT and data storage

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Data products and features

Ground Controlled

Consistent Sensor Tech & Flight Plans

Photogrammetric Quality Standards

4-Band Data (RGBN)

Machine Learning Ready

Cloud Hosted (AWS)

Orthophotos (4-band)

- 15 cm (0.5 ft.) GSD wide area coverage
- Available for streaming & download
- Ideal as a land base for GIS applications

Elevation Products & Stereo Imagery

- DSM and Stereo imagery available for 30 cm and 15 cm GSD data
- Broad coverage of the US and Europe
- Ideal to extract 3D vector maps and clutter

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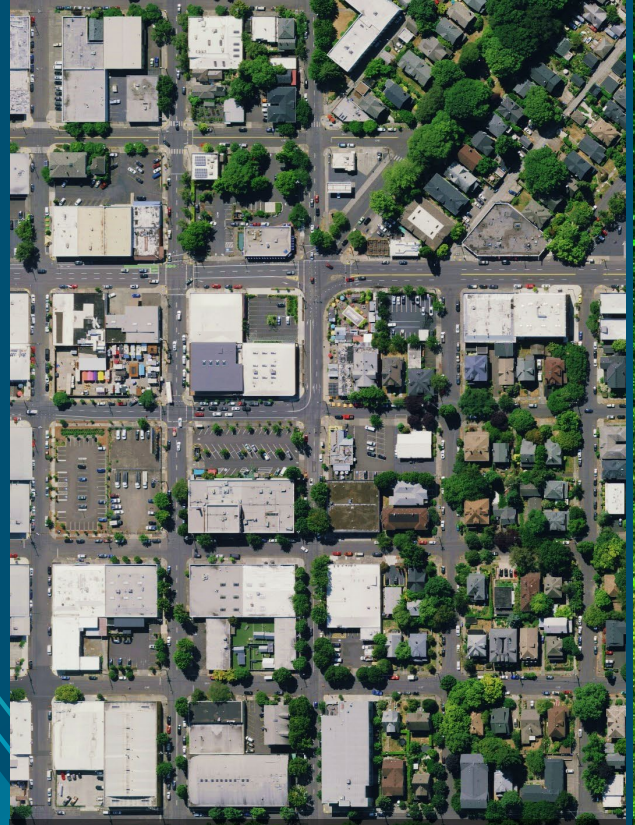
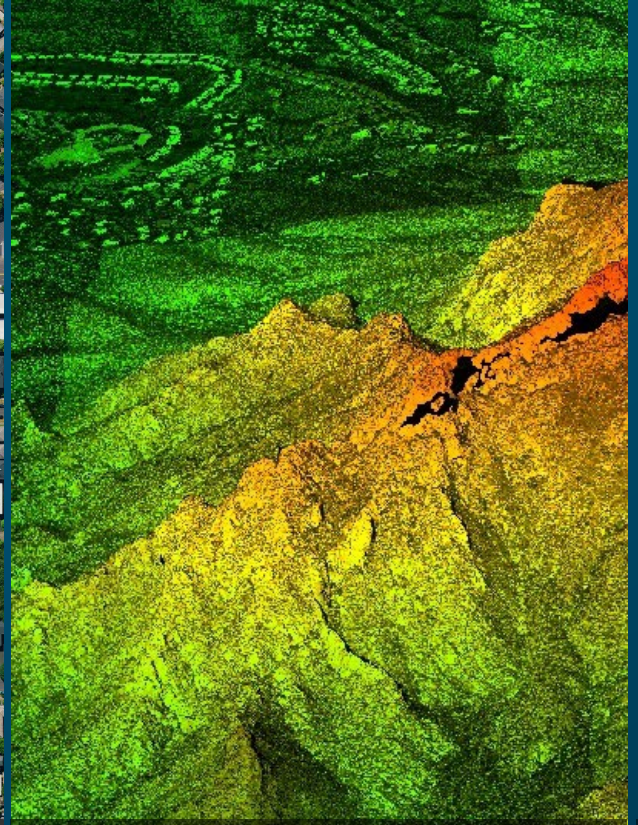
Standard data products



Orthophotos (4-band)

- 30 cm and 15 cm GSD wide area coverage
- Available for streaming & download
- Ideal as a land base for GIS applications



Elevation Products and Stereo Imagery

- DSM and Stereo imagery available for 30 and 15 cm GSD data
- Coast-to-coast coverage of the United States
- Ideal to extract 3D vector maps and clutter

Machine Readable Data

- Consistency and positional accuracy
- Great licensing terms
- Ideal training data set for automatic feature extraction and analytics

Sensor Updates

Evolution of wide area and hybrid imaging

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Hexagon Content Program

Leica ContentMapper

Leica ContentMapper
Collect data more quickly and efficiently without the sacrifice

ADS100 **20,000 pixels across swath**

ContentMapper **40,000 pixels across swath**

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Optimized for Efficiency and Resolution

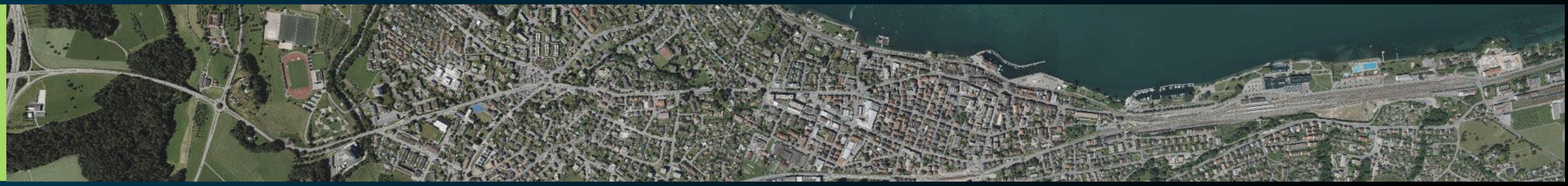
Flight Altitude: 16,000 ft AGL

5.5 x 1.1 km swath

40,000 pixels across swath

15 cm GSD

ContentMapper



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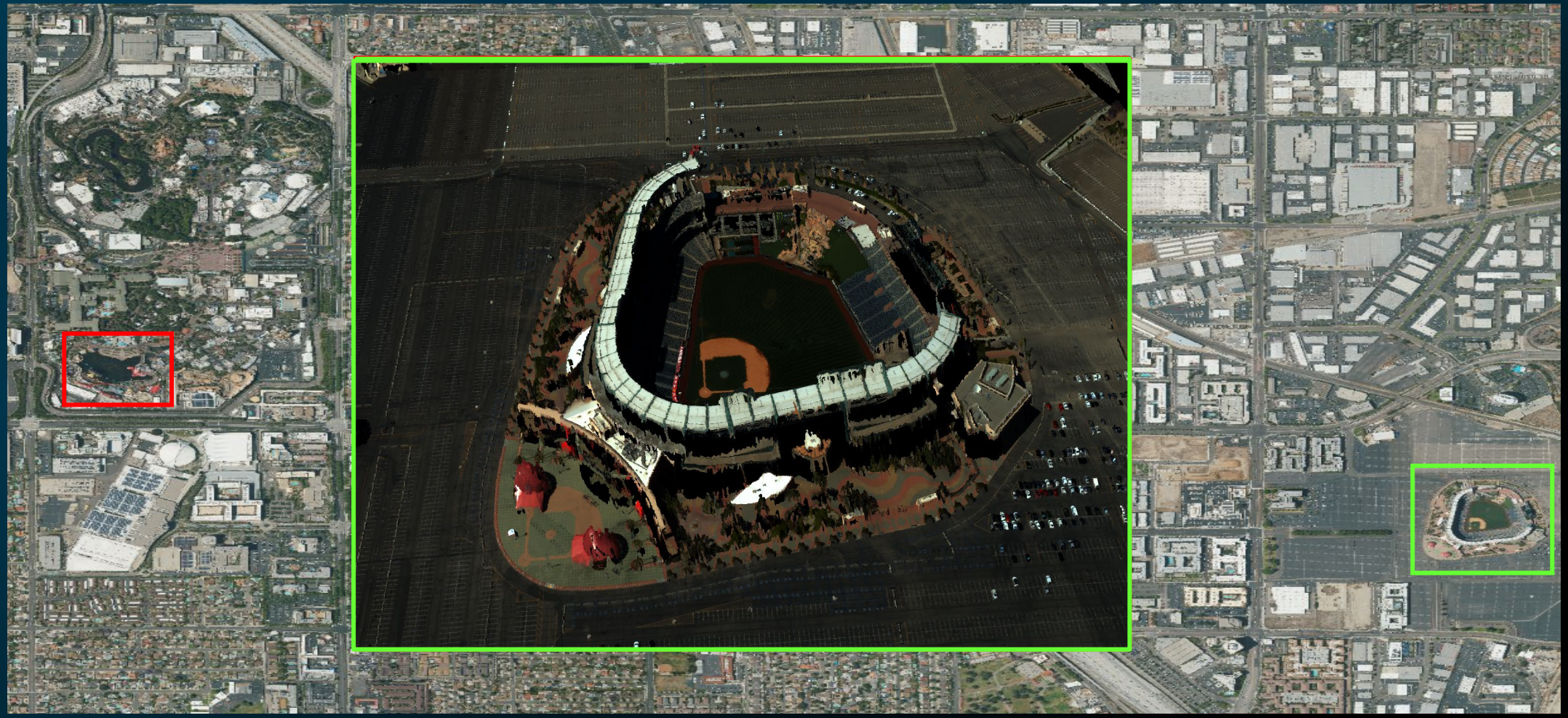
Hexagon Content Program

ContentMapper – 2D and 3D Statewide Data Refresh at 15 cm



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Leveraging Forward-Motion Compensation

Shift the image to counteract blur from flight motion

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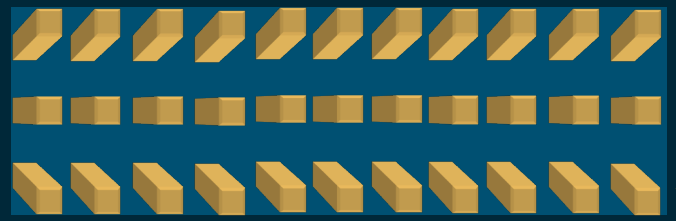
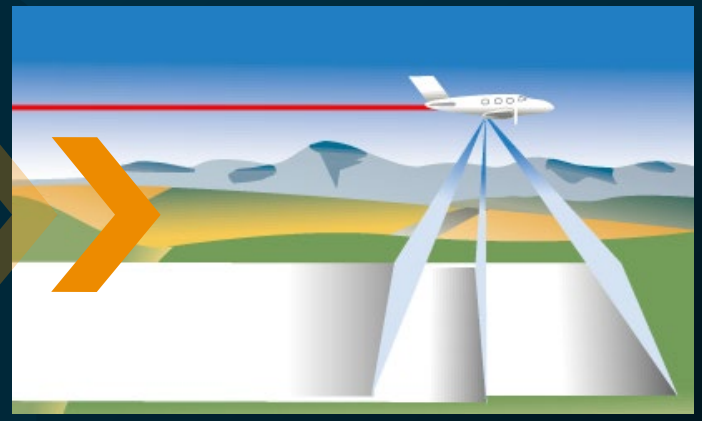
Shift in Technology

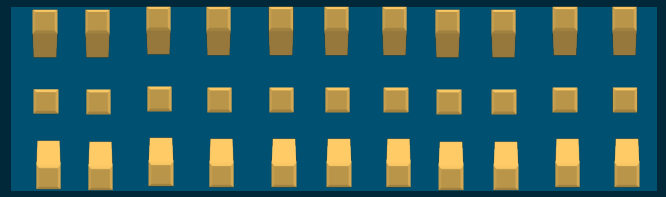
Airborne Line Sensor

Forward View Strip

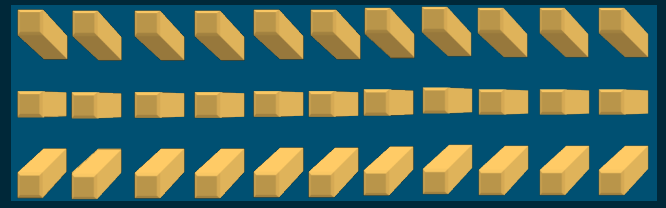


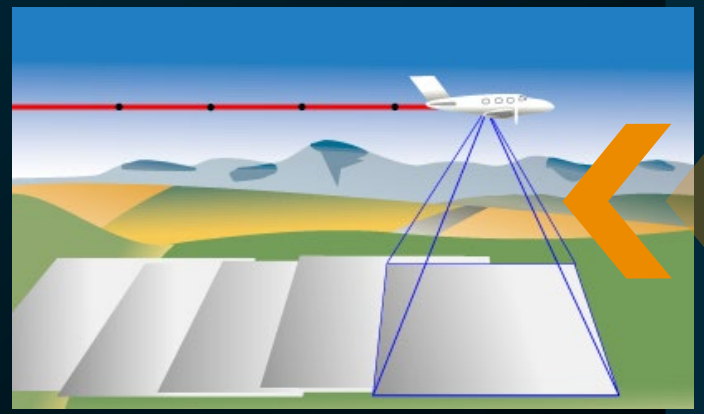


Nadir View Strip



Backward View Strip

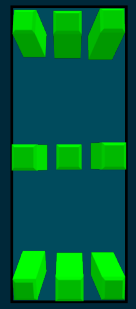




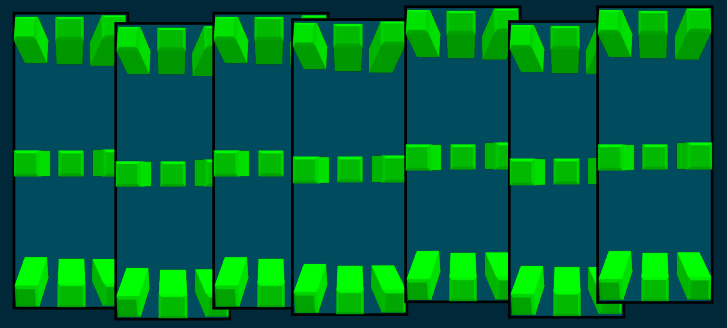
High-Aspect Frame Sensor

ContentMapper

Photograph with Central Perspective



Flight Line with Overlapping Photographs



Content+ offering for state governments

Licensed data tailored to your needs

- Leaf-off imagery acquisition
- Increased refresh cycle per AOI or statewide
- Higher imagery resolution
- Flexible buy-ups for additional geospatial data products
- Eliminate the need for IT and data storage
- Leverage existing or new data specifications

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Content+ offering for state governments

Flexible imagery program that meets states needs

Maintain or expand data characteristics of current state program

Public domain availability at 60 cm resolution

Accurate and **comprehensive** data products

Deliver to all state stakeholders under **flexible user terms**

Deliver to stakeholders via **convenient streaming services**

Flexible payment options and **cost savings**

Build **analytics** to gain **insights** on data

Build **relationships** and focus on delivering to state **customers**

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HxGN Content Program's U.S. state partners

USDA United States Department of Agriculture
Natural Resources Conservation Service

TNRIS

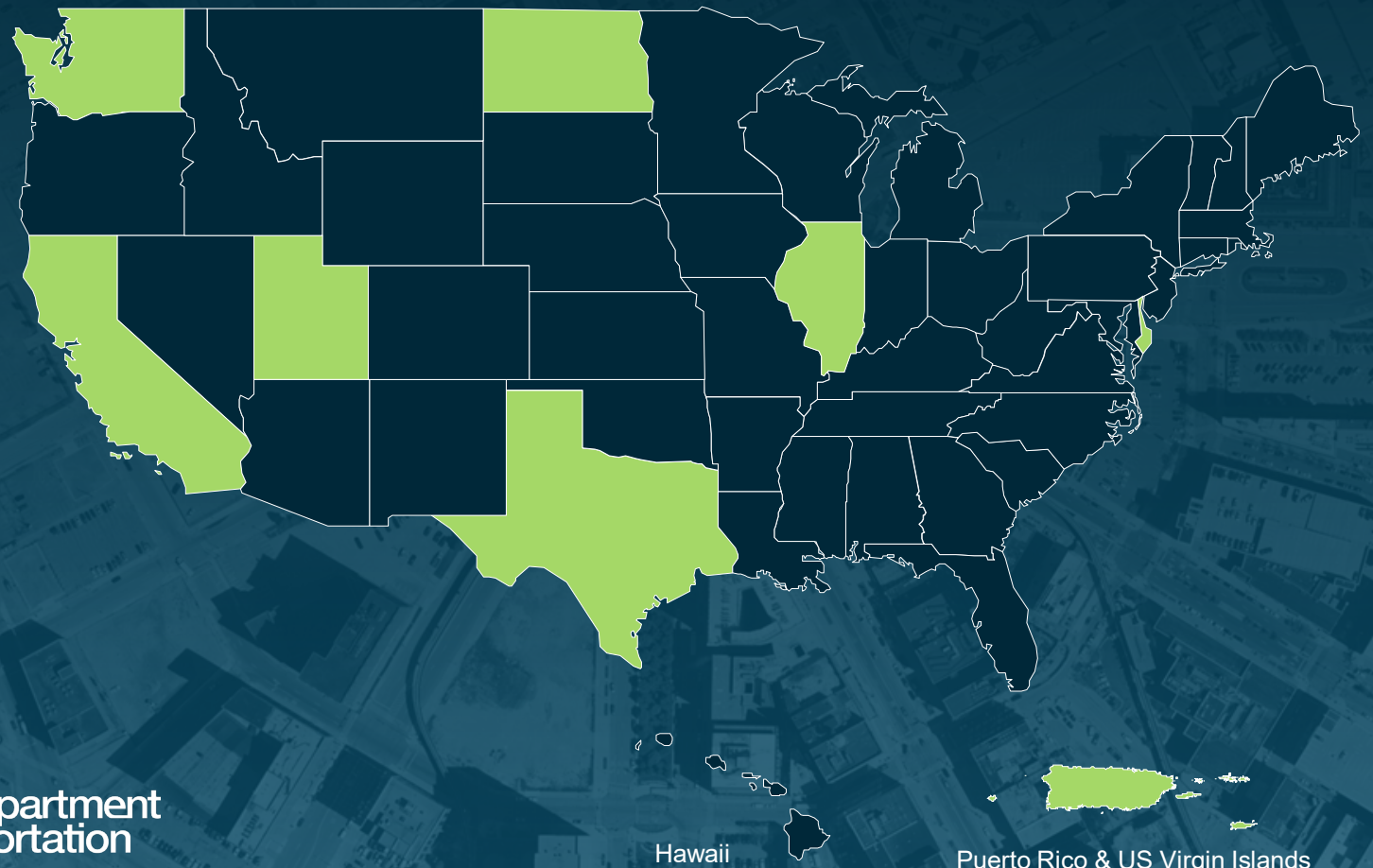
North Dakota
Be Legendary.™

Caltrans

Puerto Rico

DelDOT

Illinois Department of Transportation



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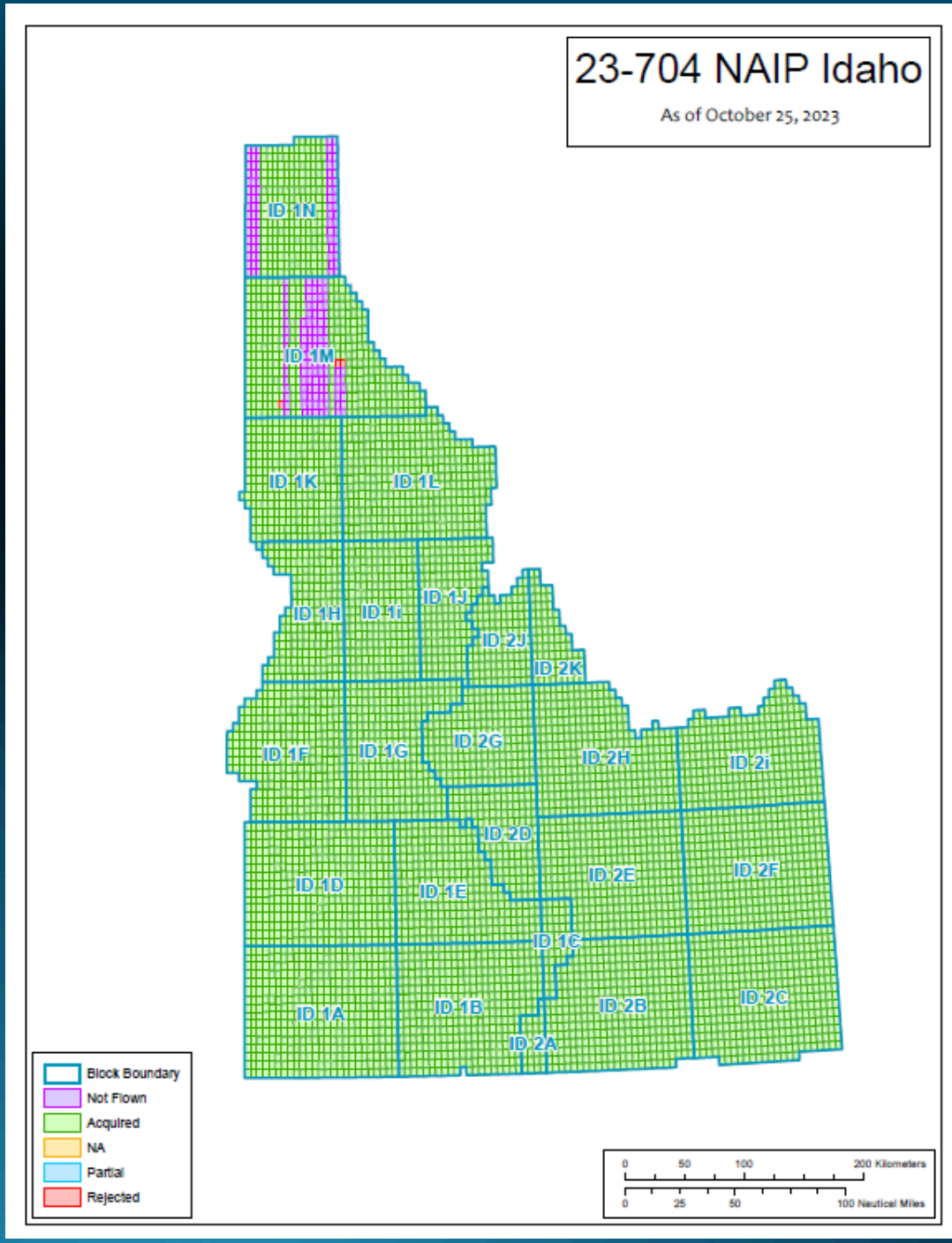
Idaho Status

2023 15 cm ortho image data available March – April 2024

2021 30 cm ortho image data available now

15 - 50 cm DSM produced on-demand

15 – 30 cm Stereo images produced on-demand



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5G network implementation

3D city models are providing infrastructure intelligence in the race for network coverage

5G networks require lots of small cells to be installed on city infrastructure like utility poles, lamp posts and buildings to ensure line of sight is maintained.

Large Network companies are using 3D data from the HxGN Content Program as base map for view shed analysis.

Vector map conflation

Utilities need authoritative base maps to derive true ground position for distribution assets

Several utilities use the HxGN Content Program as the authoritative base map to conflate distribution network vector maps to derive true ground position.

The resulting base map/conflation data will serve as the base data for future GIS and asset management processes.

Solving parking problems

A German start-up is putting AI to work to extract parking information

A German startup has built a predictive parking solution to provide relevant, real time information that points you to available parking spots.

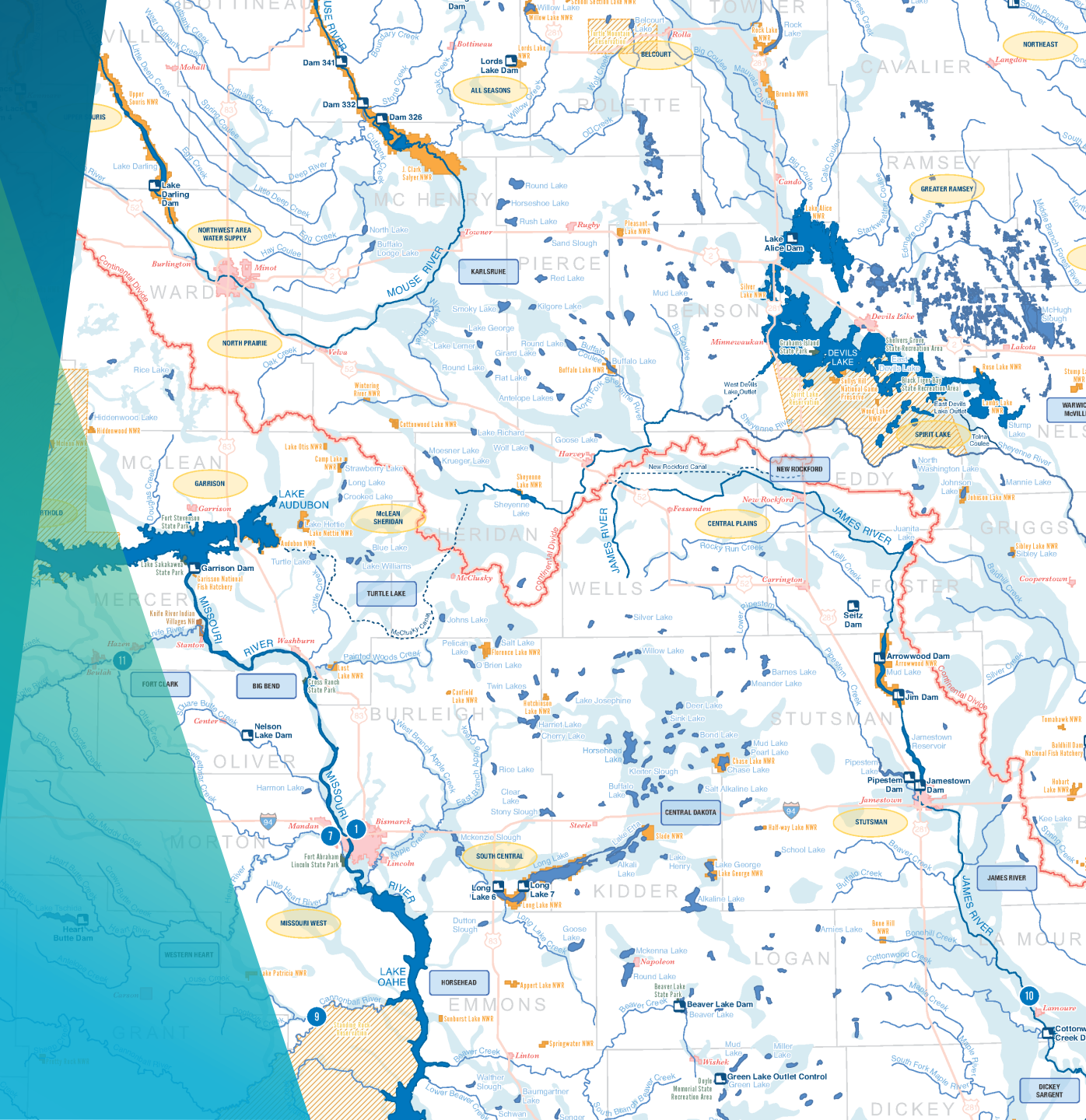
They use the HxGN Content Program so their AI algorithms can extract parking lot information in cities.

Study wetlands and plant life

State of North Dakota state water commission using 4-band orthophotos

The State Water Commission entered into a three-year HxGN Content Program agreement, covering over 187,000 km2, to support a statewide wetlands and plant life study. Integral to the study is the false color infrared imagery allowing for precise vegetation analysis.

Both physical delivery of data and streaming services included.



Managing transportation assets

California Department of Transportation (CalTrans)

The HxGN Content Program provides RGB/CIR orthoimage data to CalTrans covering the 80,000 km2 of California's highway, freeway, intercity rail lines and over 400 public use airports.

The aerial data provided by Hexagon is used for various GI, engineering, asset monitoring and long-range planning activities.

Thank You

Rob Eadie

Partner Manager

robert.eadie@hexagon.com

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