Partnerships and Business Models

Access to High-Resolution Geodata in a Collaborative Approach

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REPUBLIKA SLOVENIJA
MINISTRSTVO ZA OKOLJE IN PROSTOR
GEODETSKA UPRAVA REPUBLIKE SLOVENIJE

HEXAGON

We rely on the unique contributions that each of our businesses add to the whole.

Manufacturing Intelligence

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

PPM

Transforming unorganized 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 what 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.

Hexagon Geospatial Content Solutions (GCS)

Hexagon Content

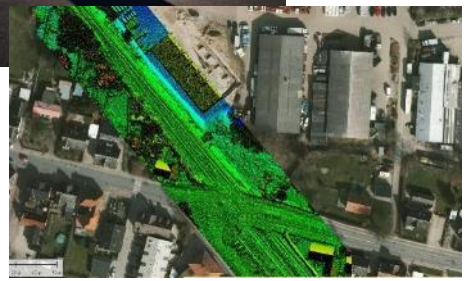
- Image-based (Orthophotos, Oblique)
- 3D terrain (DSM, DTM, 3D-Mesh, point clouds)
- Derived layers
- Partner-based

Airborne Sensors

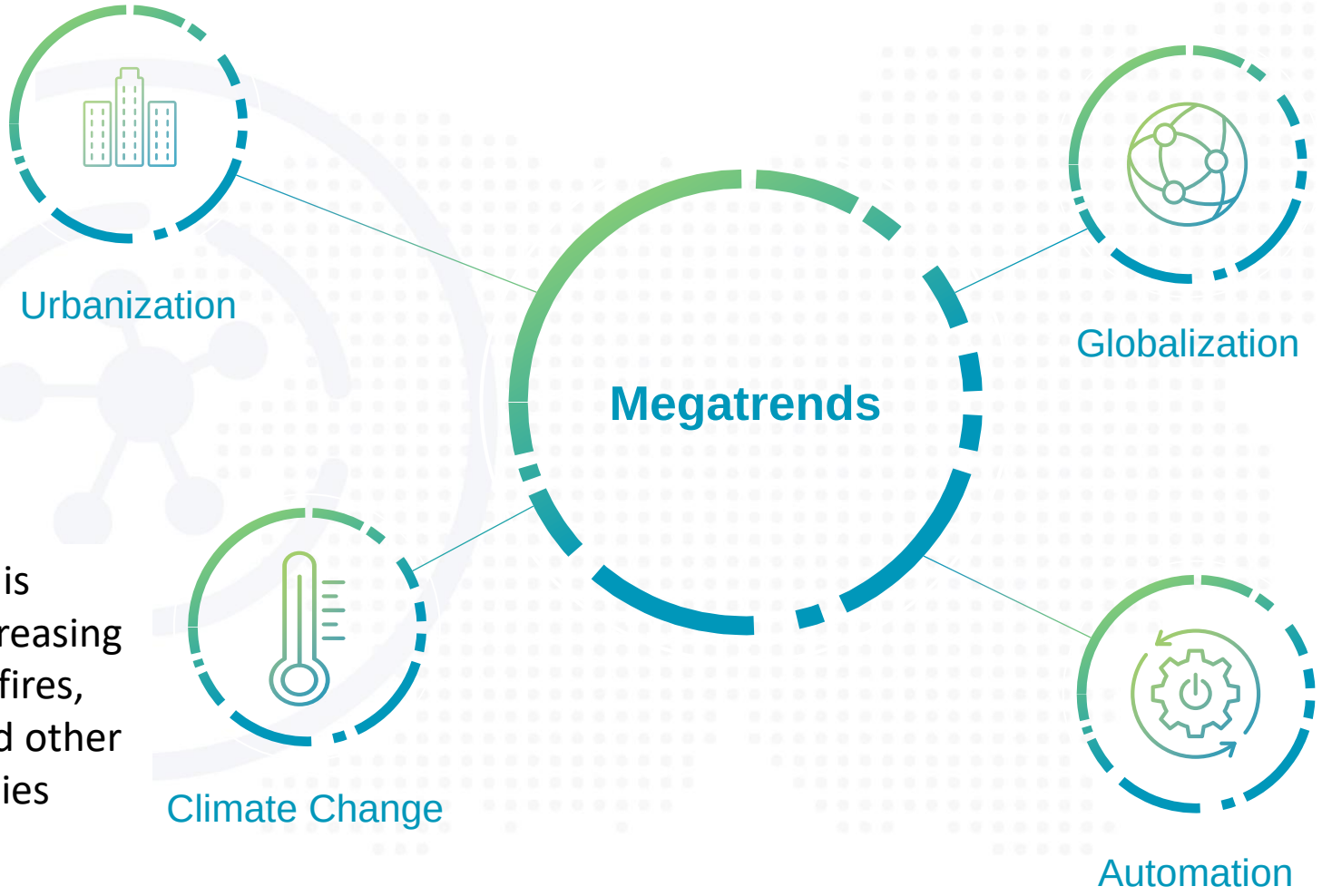
- ContentMapper
- DMC-4
- ADS100
- CityMapper 2
- SPL100
- TerrainMapper-2

Services

- Data-capture
- Image processing
- Lidar processing
- Cooperation with Hexagon customers
- Strategic Projects



Requires disruptive approaches to maintain manageability and livability of urban mega-spaces

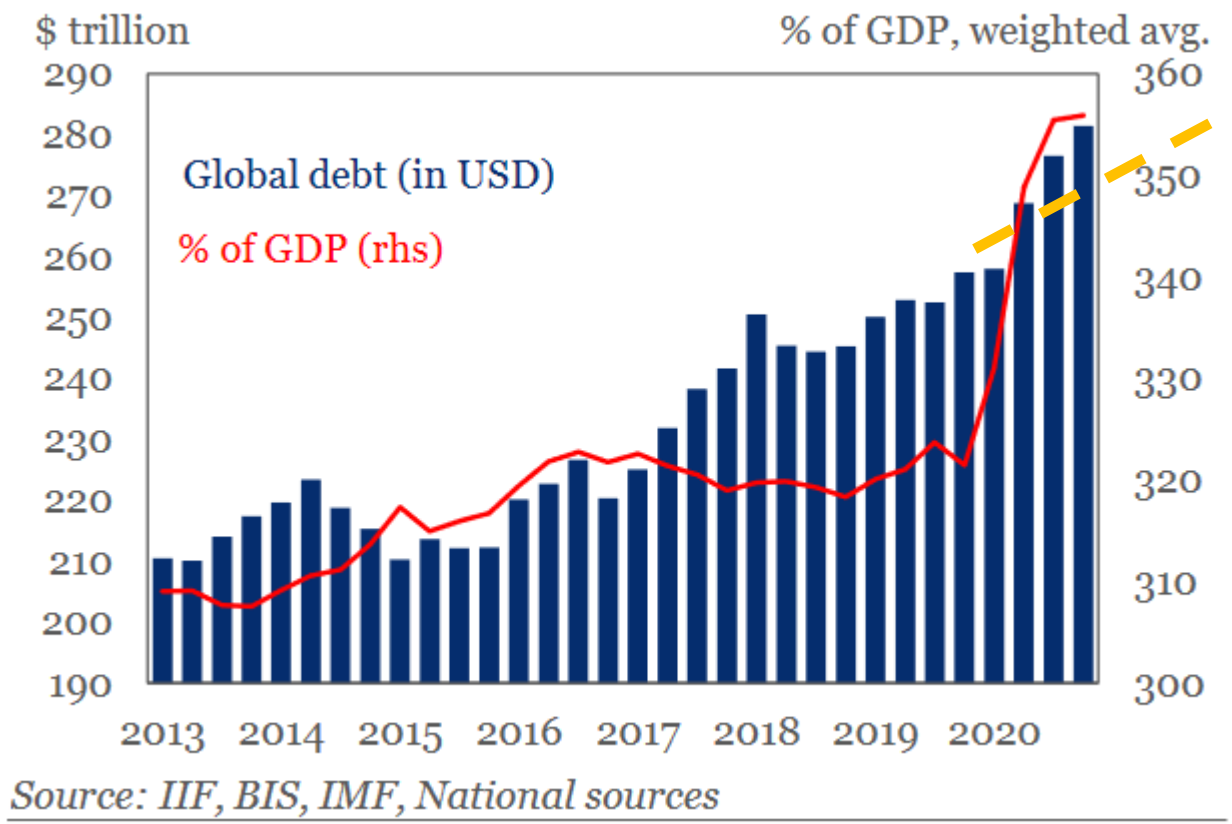


Geopolitical shifts are rapidly changing the relations between major actors

A climate crisis is threatening with increasing strength with wildfires, droughts, floods, and other weather anomalies

Artificial intelligence is outpacing human productivity and acting as creative entity on its own

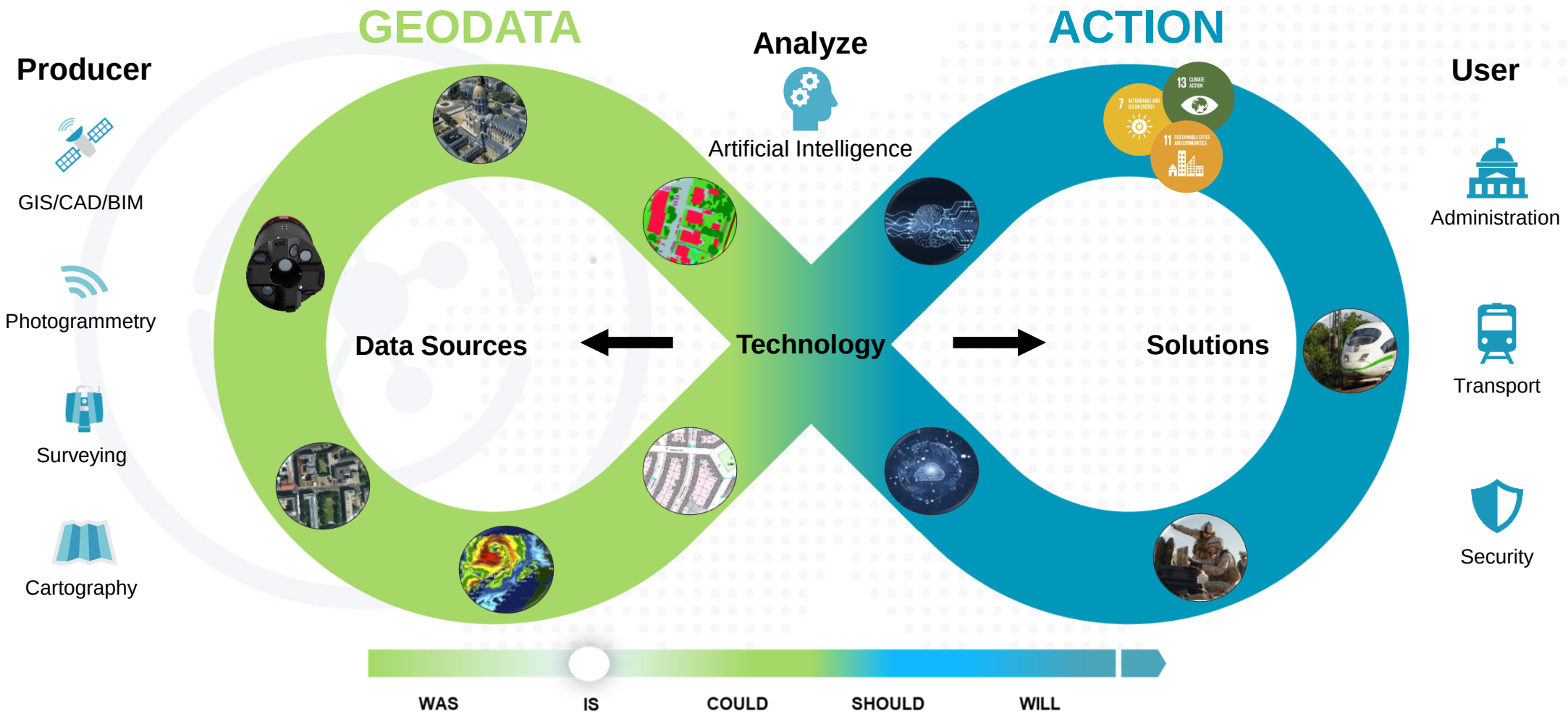
Borrowing from the Future



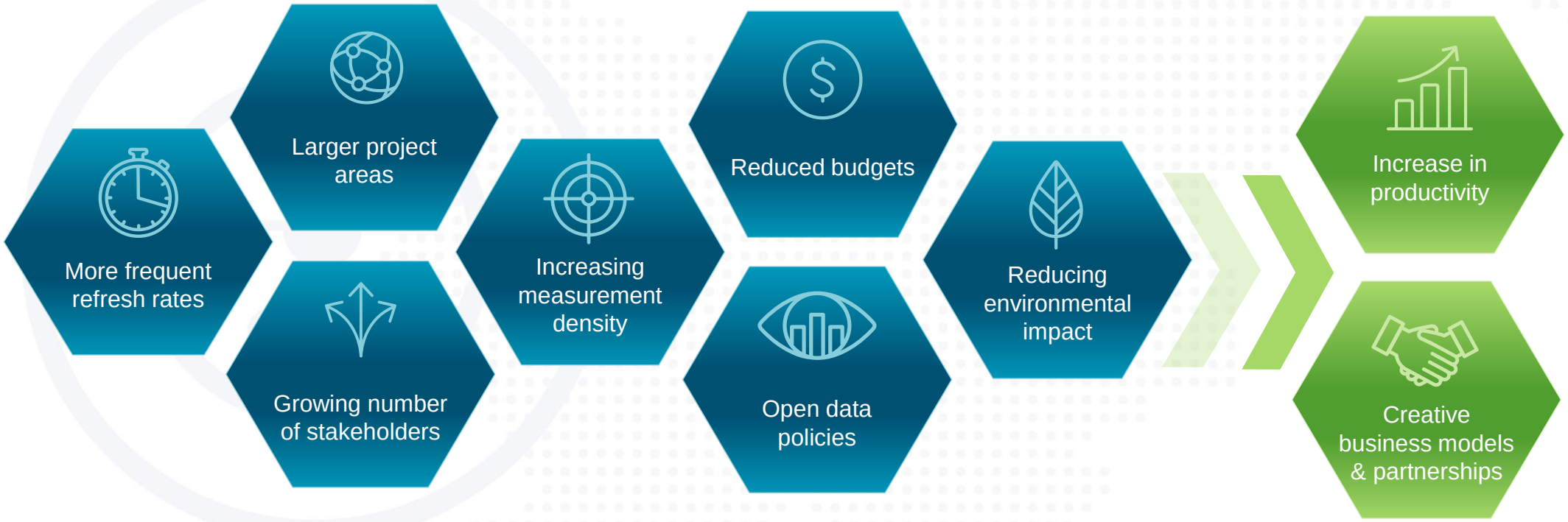
Should the Geospatial Industry still rely on traditional contracts?

How long can Public Users still rely on availability of budgets?

Digital Twins

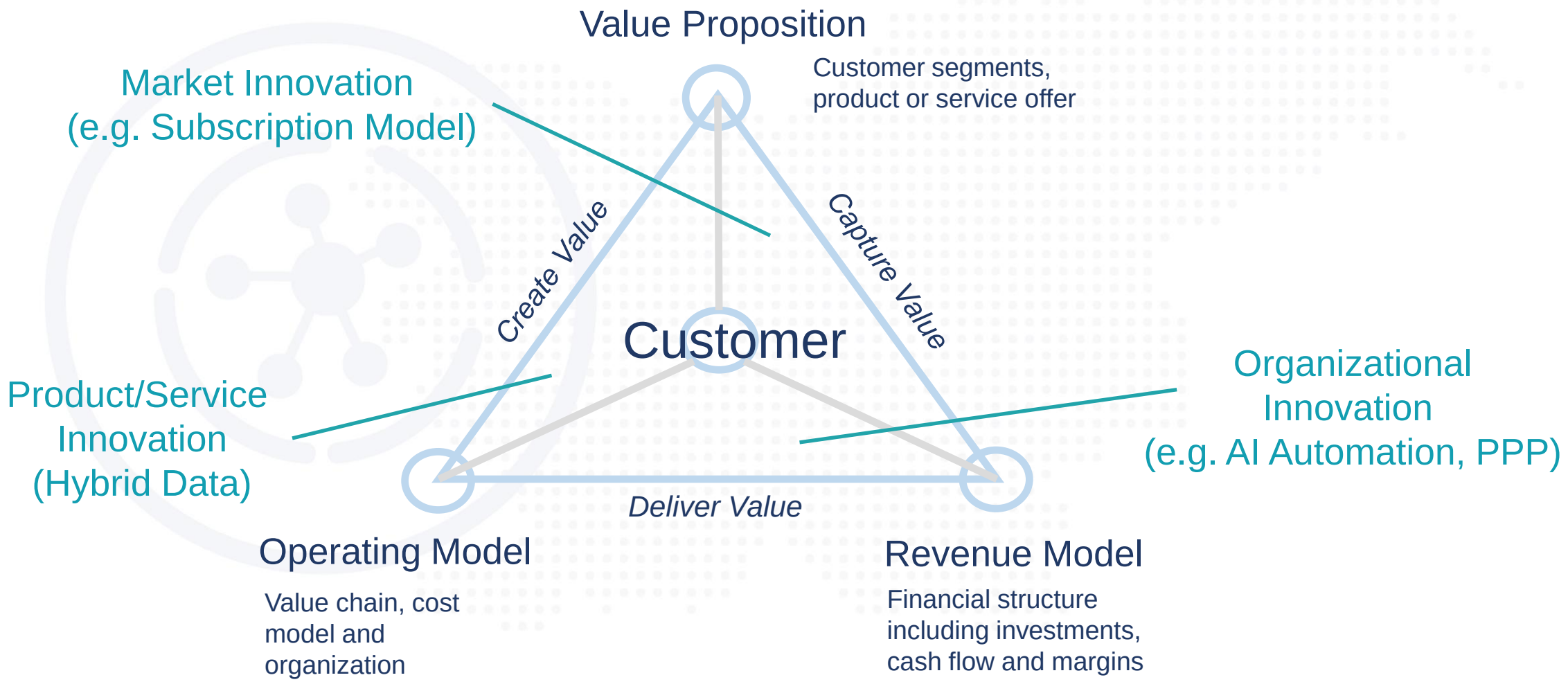


Industry Trends – Base data



Source: Hexagon AB

Business model innovation



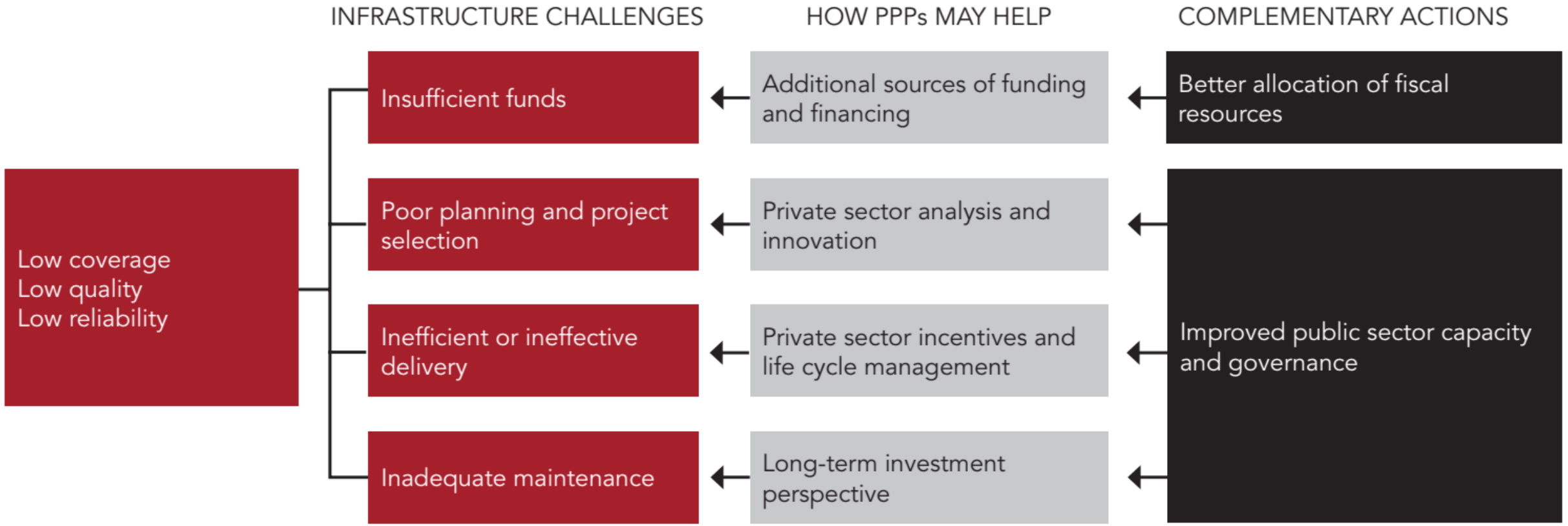
PPP models

The World Bank PPP Knowledge Lab[1] defines a PPP as:

"a long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility, and remuneration is linked to performance."

→ Allocate the risk to the party that can best handle it.

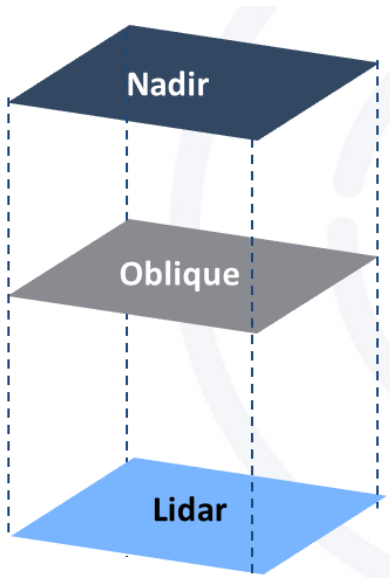
Challenges and how PPP can help



Source: World Bank 2020

Sources and use of Geodata in our World today

Data Types

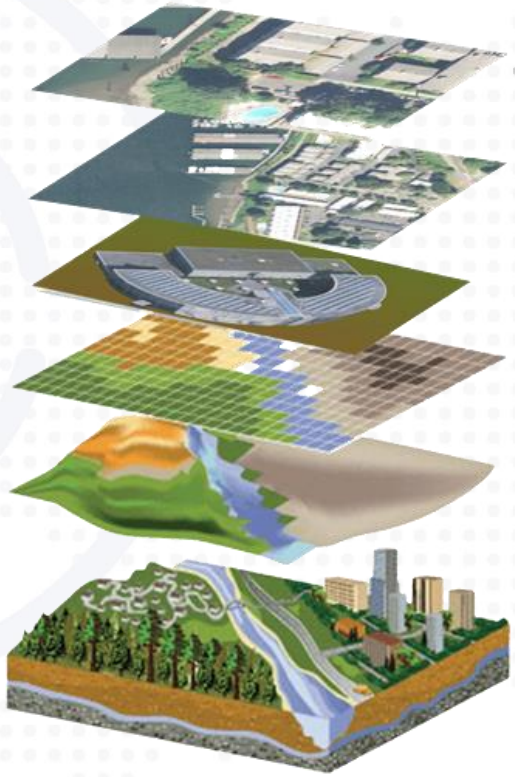


Satellite, Drone

Aerial Survey/ Mobile Mapping

Drone

Content Types



(Ortho) TrueOrtho

Obliques

3D Vector model

Classified Raster (Land use)

LQ: Photo DSM/DTM
HQ: Lidar DSM/DTM

3D Mesh

- Municipalities
- State institutions
- Fire and safety
- Public transportation
- Water and wastewater
- Electricity
- Heating
- Telco
- Waste Management
- Engineering and architects
- Media
- Finance
- Construction
- Urban objects
- Other Private

More than **80% of HiRes data** for planning are created from Aerial Survey

Business elements - Geodata

Design

- Requirements
- General Standards

Data Procurement(Build)

- Own production
- Service contract (obtention of all generated products incl. intermediate)
- Defined Data Product procurement
- License (perpetual, temporal, restricted/unrestricted)

Ownership/Control

- IPR with NMCA
- Shared IPR with Business
- No IPR

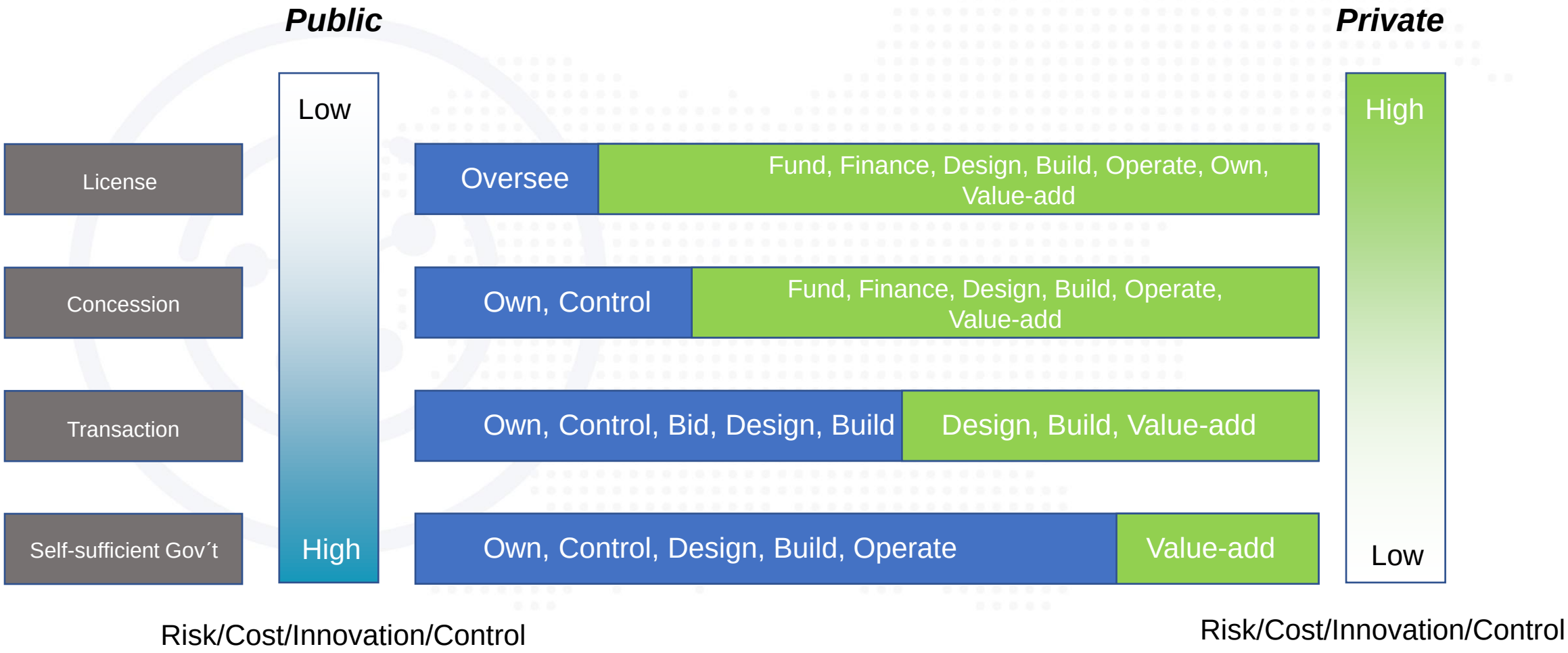
Funding/Financing

- 100% governmental budgets
- Co-financing with private business
- Debt-financing (Bank)
- Full private funding/financing
- Commercialization
- Channels
- Pricing structure

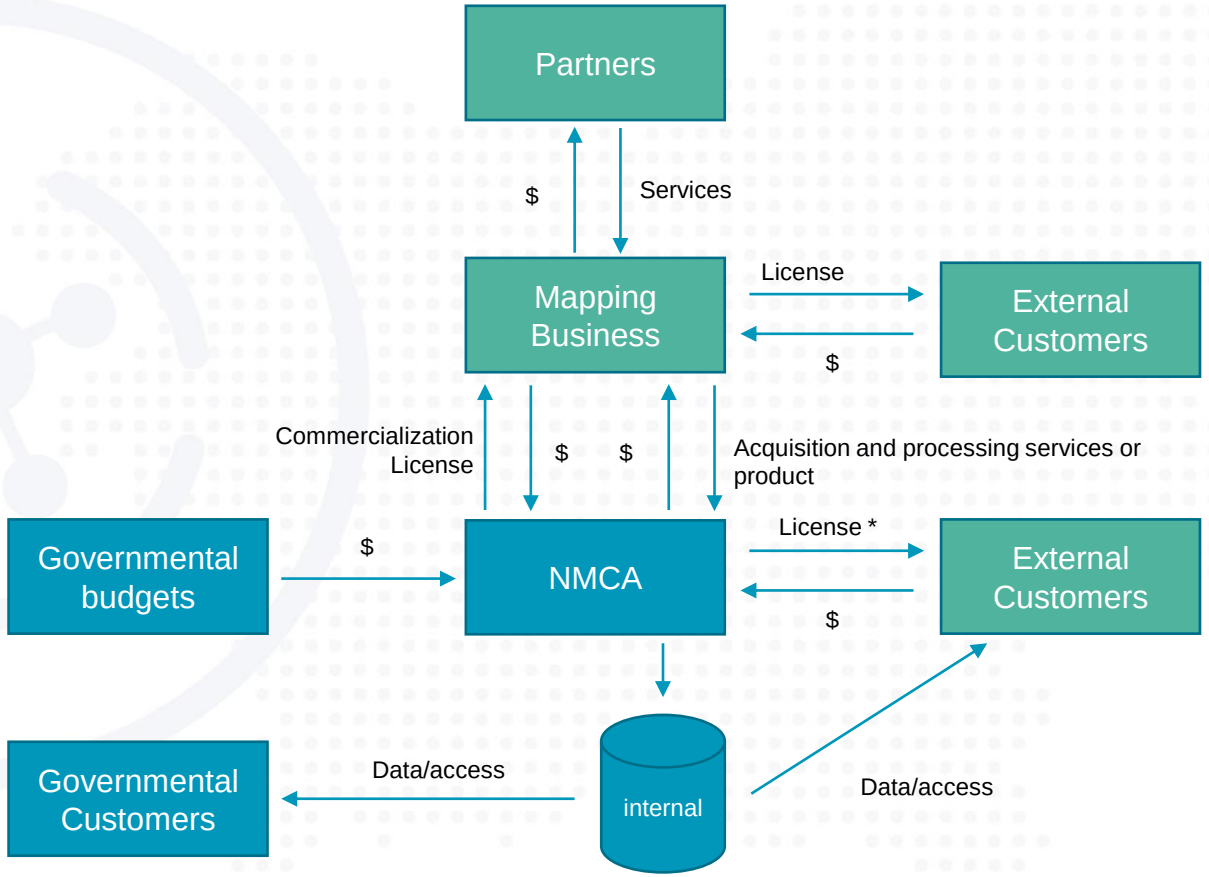
Maintenance/Operation

- Storage
- Access interfaces and methods
- Rules/Regulations

PPP models for base data

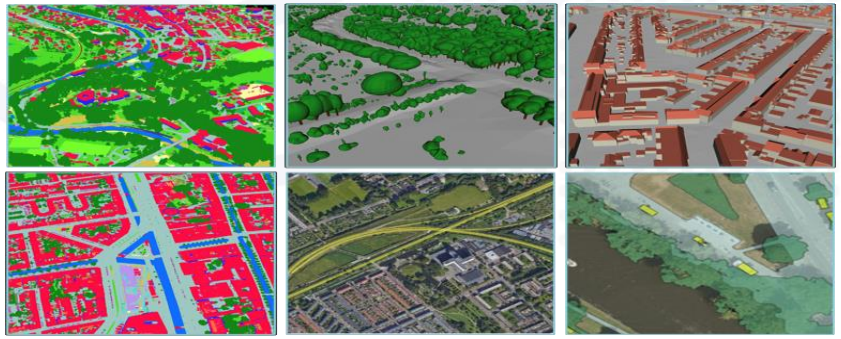


Business Model – Concession (Through back-licensing)

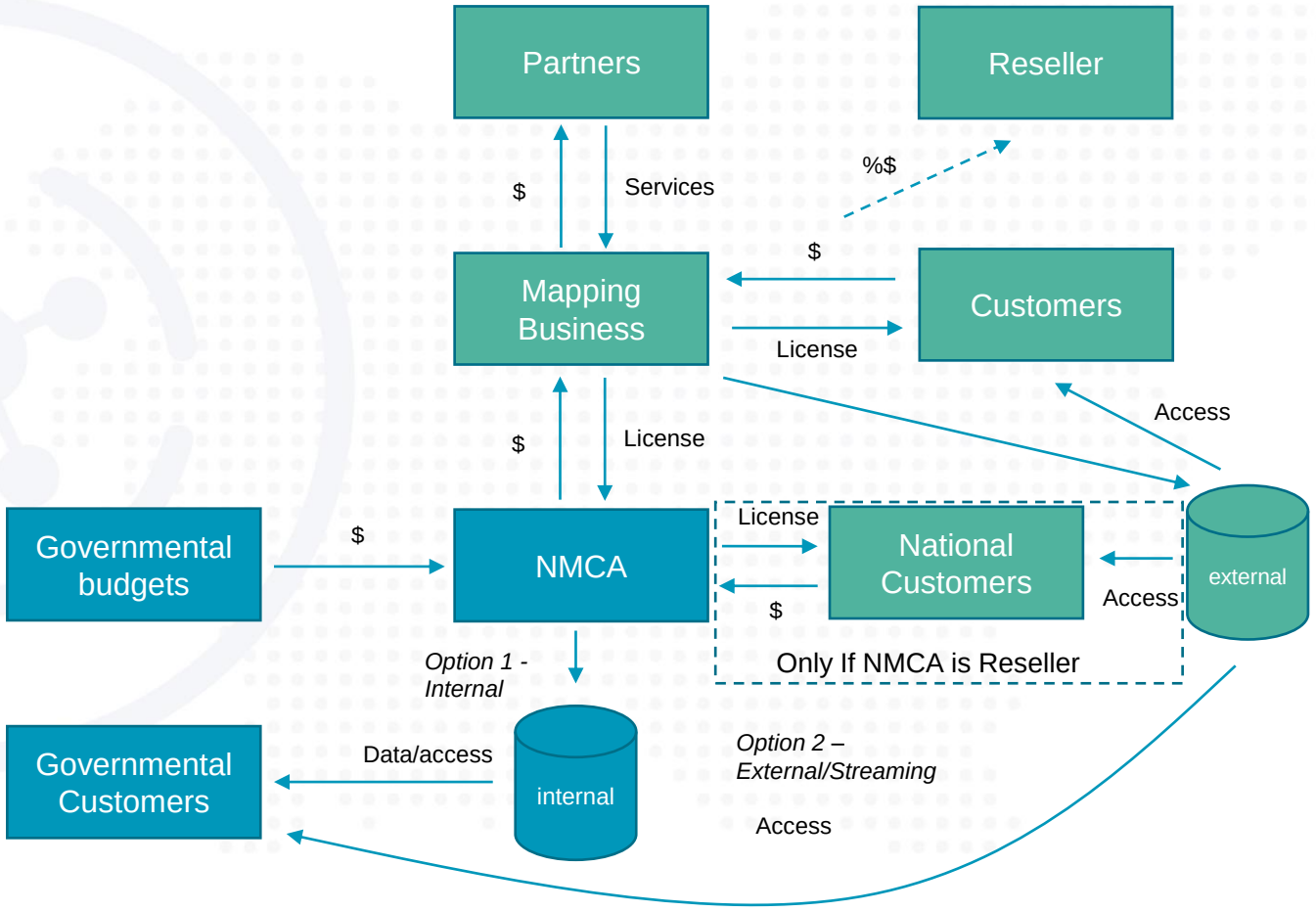


Multi – purpose, high resolution, hybrid City Data – Munich, Germany

- First fully hybrid data set for a City in Germany – part of CUT
- Complete, synchronous acquisition of aerial survey data types Nadir, Oblique, and Lidar
- Application for any type of public and private data user
  - Demand has been stated by most German cities for public and private uses
  - Creation of a coherent dataset for spatial based decisions



Business Model – License and Resales – IPR with Company



Digital Surface Model Germany – Hexagon Content

- Federal Authority for Cartography and Geodesy
- First homogeneous and high-resolution DEM Geospatial data set of Germany
- Homogeneity relevant for transborder planning (federal and European)
- Industrial applications
- Data set for the BKG as central Data provider
  - Need stated by various Federal authorities, e.g. Disaster management, Crisis preparedness and Air Traffic Control.

Bundesamt für Kartographie und Geodäsie

Bundesamt für Bevölkerungsschutz und Katastrophenhilfe

DFS Deutsche Flugsicherung

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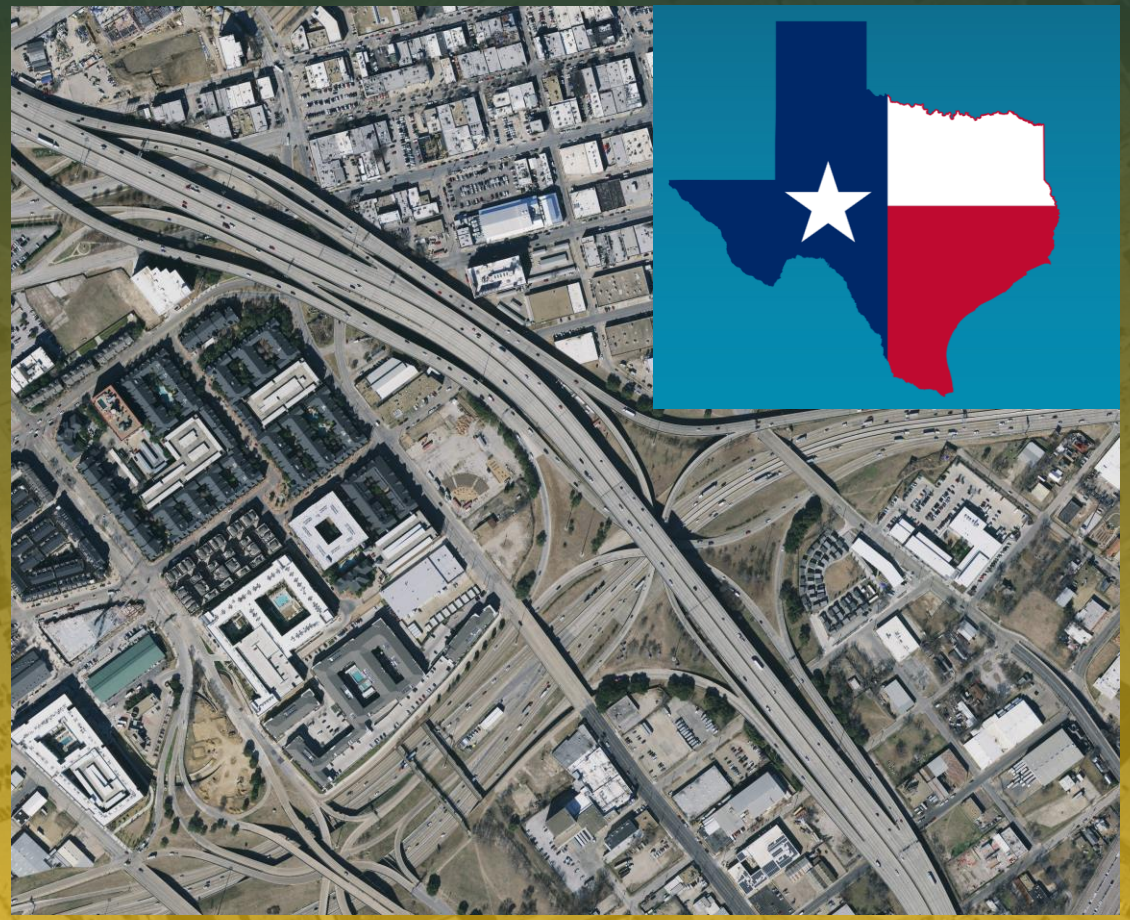
State of Texas – 15 cm state-wide program- Hexagon Content



The Texas Natural Resources Information System (TNRIS) selected the HxGN Content Program's 15 cm statewide data.

Texas benefits from more frequent refreshes and higher resolutions for their state imagery program. The data has higher horizontal accuracy due to more rigorous orthorectification and ground control.

The state received immediate access to the imagery and enjoys flexible data sharing options under a licensed product agreement.

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Hexagon Content Program

Data Products and Features

Ground Controlled

Consistent Sensor Tech & Flight Plans

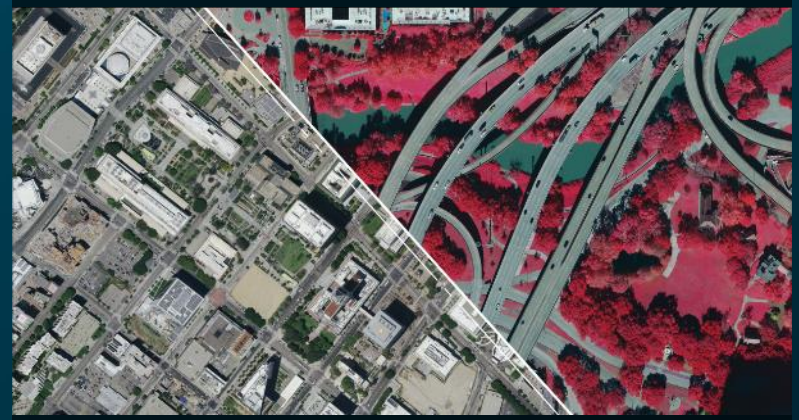
Photogrammetric Quality Standards

4-Band Data (RGBN)

Machine Learning Ready

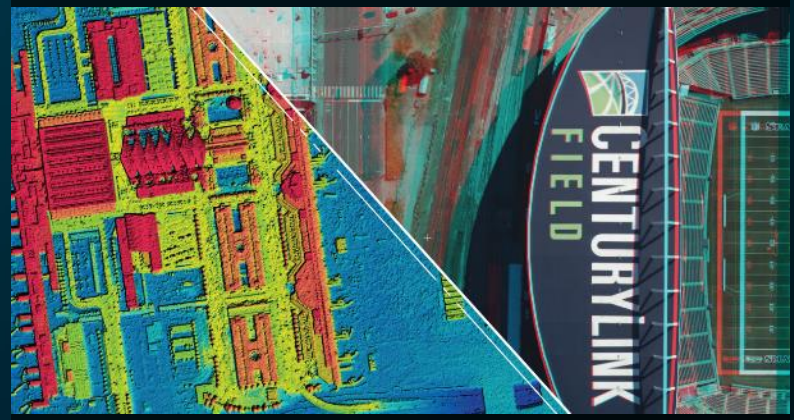
Cloud Hosted (AWS)

Orthophotos (4-band)



- 15 cm GSD wide area coverage
- 5-7.5 cm GSD urban area coverage
- Available for streaming & download
- Ideal as a land base for GIS applications

Elevation Products & Stereo Imagery



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

DMC-4 Airborne Camera

Precise, Productive, Flexible

- Precise images
  - Only product with CMOS + FMC
- High productivity
  - Unmatched 4-band, 31,520 cross-track pixel count
- Flexible
  - 58° and 45° FOV configurations cover varying GSD and flying heights
  - Fast 0.8-second frame interval for forward overlap and aircraft speed freedom
  - Frame format supports conventional aerial photo workflows and stereo feature collection as well as automated infocloud, DSM and true-ortho generation

8 Years of Continuous Data Collection

2014

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

11 states captured in the first season including Texas and California

2015

20 new states captured in the U.S.

Start of European data program at 30 cm resolution

Italy, Portugal, Denmark and most of Spain Captured in the first year

2016

Start of U.S. urban program at 15 cm resolution. Captured all cities in U.S. above 50k population, making this the largest urban data acquisition year to date with 225 cities collected.

A total area of 311,11.81 km^2 were captured

2017

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

2018

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

A total if 5,123,779.86 km^2 were captured.

GSA

Availability of the data through GSA schedule

2019

aws

Content hosting migrated to AWS in both North America and Europe

HD

Through partnerships, we offer 300,000 km^2 of oblique, 3D and LiDAR data in the U.S.

USDA

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

2020

Start of 3rd U.S. refresh

6 states refreshed, including Texas at 15 cm statewide

Completion of European coverage area

2021

16 states to be refreshed in the U.S.

Start of European city program at 5 cm resolution

2022

9 states to be refreshed in the U.S.

HxGN LIVE Global

Extensive data coverage

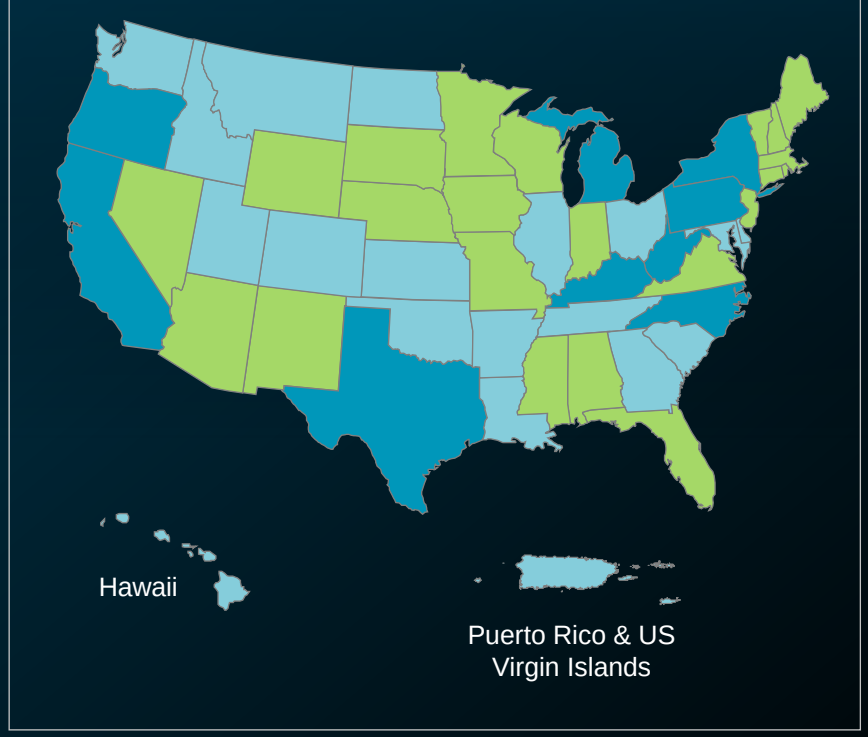
100%

complete coverage of the contiguous United States and Western Europe

27 million+ km²

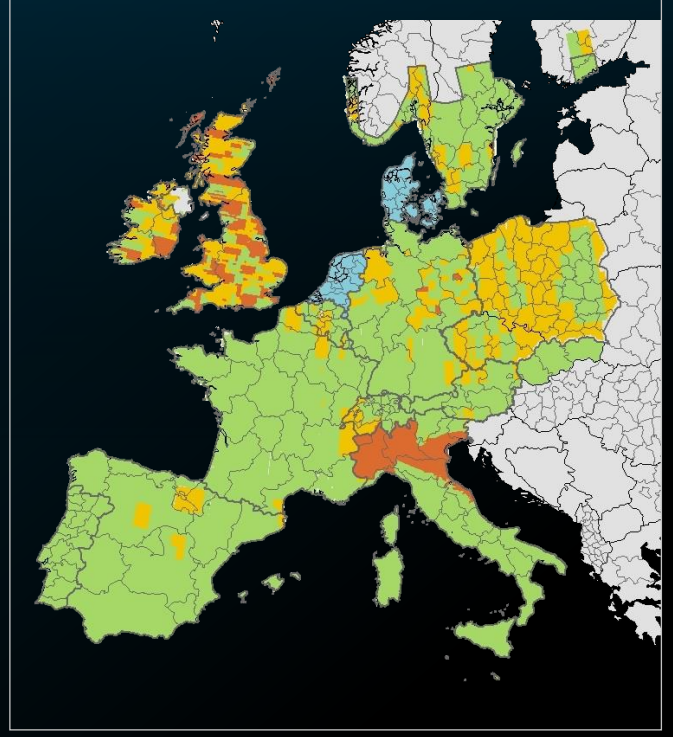
of aerial data captured since the program's launch in 2014

United States



- 2022 Anticipated Collection
- 2021 Updated Coverage
- Existing Coverage
- Partner Program

Europe



- 2022 Anticipated Collection
- 2021 Updated Coverage
- 2020 Updated Coverage
- Existing Coverage

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Hexagon Content Program Ecosystem

FLEET

20-30
planes flown per year

DATA

600+ TB
raw data collected in 2021

1 BILLION
images streamed per month

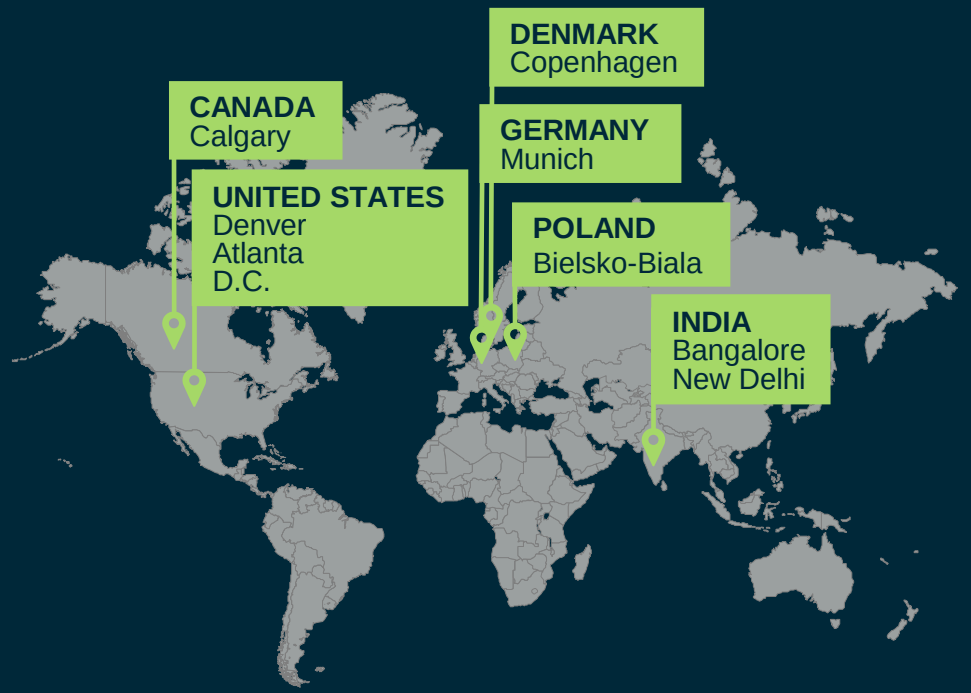
1500+
CPU cores

100 GB
network speed

12 PB
networking storage

PRODUCTION

9+ MILLION
square miles of data processed since 2014



PARTNERS

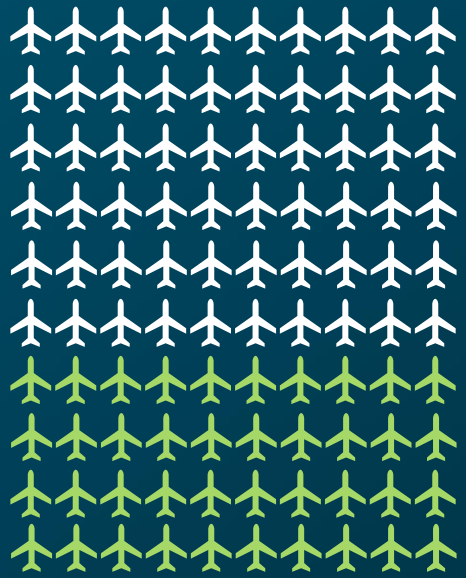
32
authorized resellers

5+
acquisition partners

7
processing teams

HxGN LIVE Global

Partner Ecosystem



60%

of the HxGN Content Program is captured by trusted **Partners**.

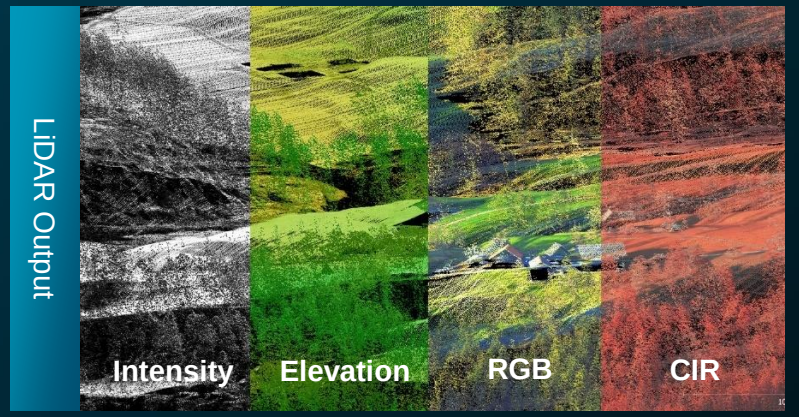
75%

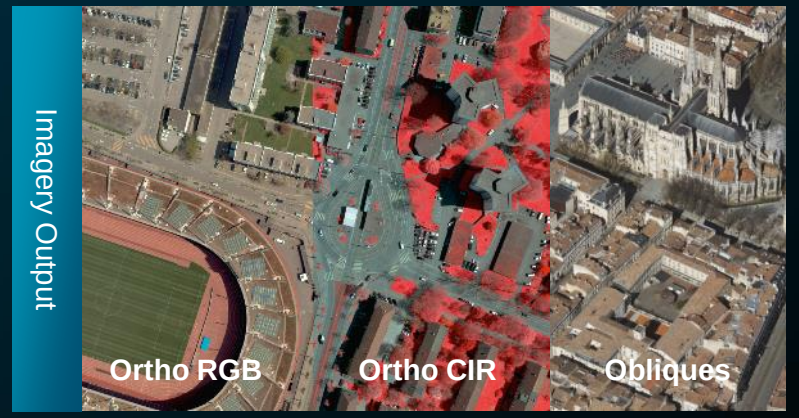
of the HxGN Content Program data is sold by **Resellers**.

Elevating the Imagery Market to New Heights

Hexagon Geospatial Content Solutions (GCS): Leica CityMapper-2

Leica CityMapper-2





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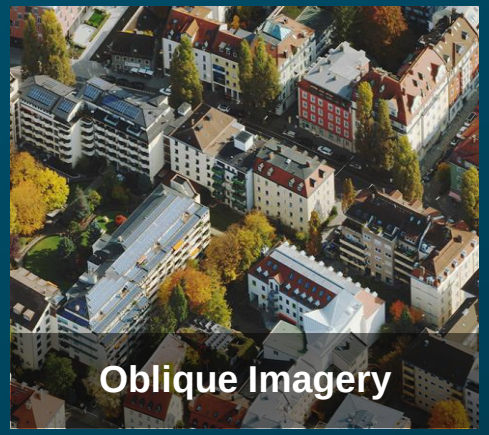
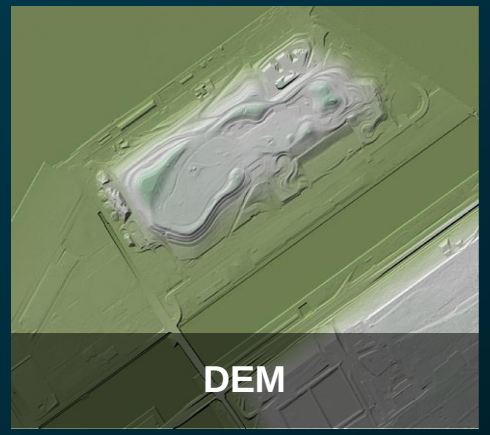
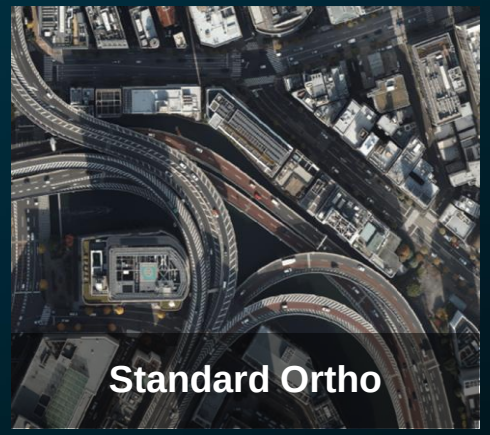
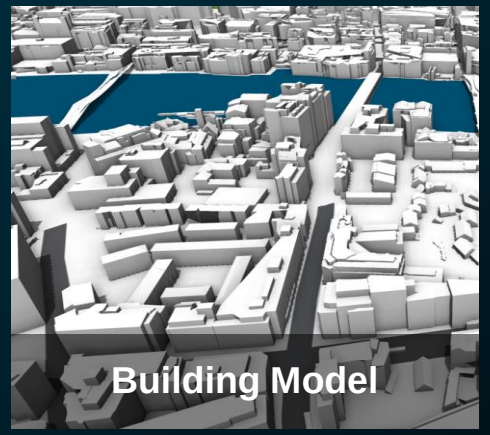
Elevating the Imagery Market to New Heights

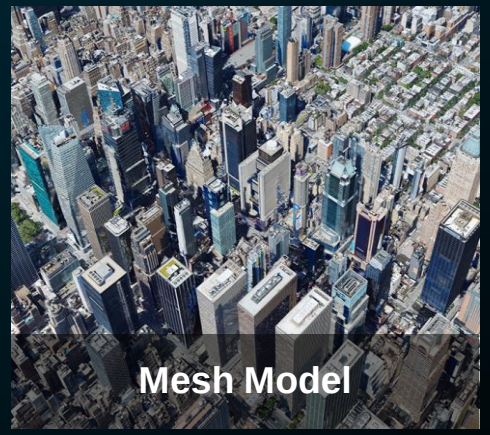
Hexagon Geospatial Content Solutions (GCS) – Metro HD Derived Data Products











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Metro HD Data Visualizations

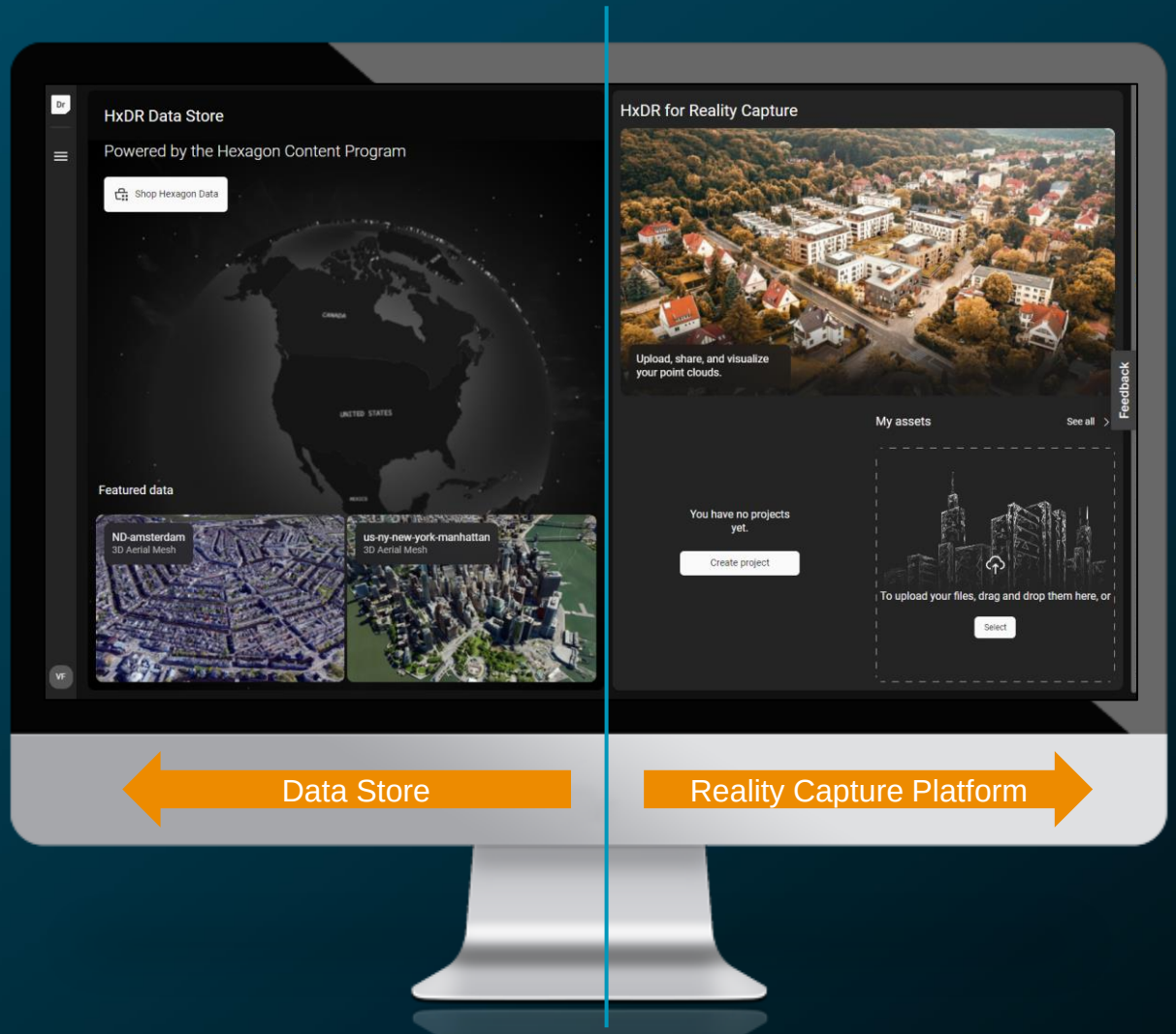
Data Derivatives

Metro HD Data Visualizations

Supermesh Perspective

Hexagon Digital Reality (HxDR)

Hexagon Content and HxDR – New data store coming online



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Success factors PPP

Success of a PPP is determined by

- Legal and regulatory framework
- Stability of the legal environment
- Attitude of the stakeholders
- Public acceptance
- Quality of the service provided
- Trustful relationship between the Private and the Public entities
- Transparency from day 1
- Clear division of tasks and responsibilities

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