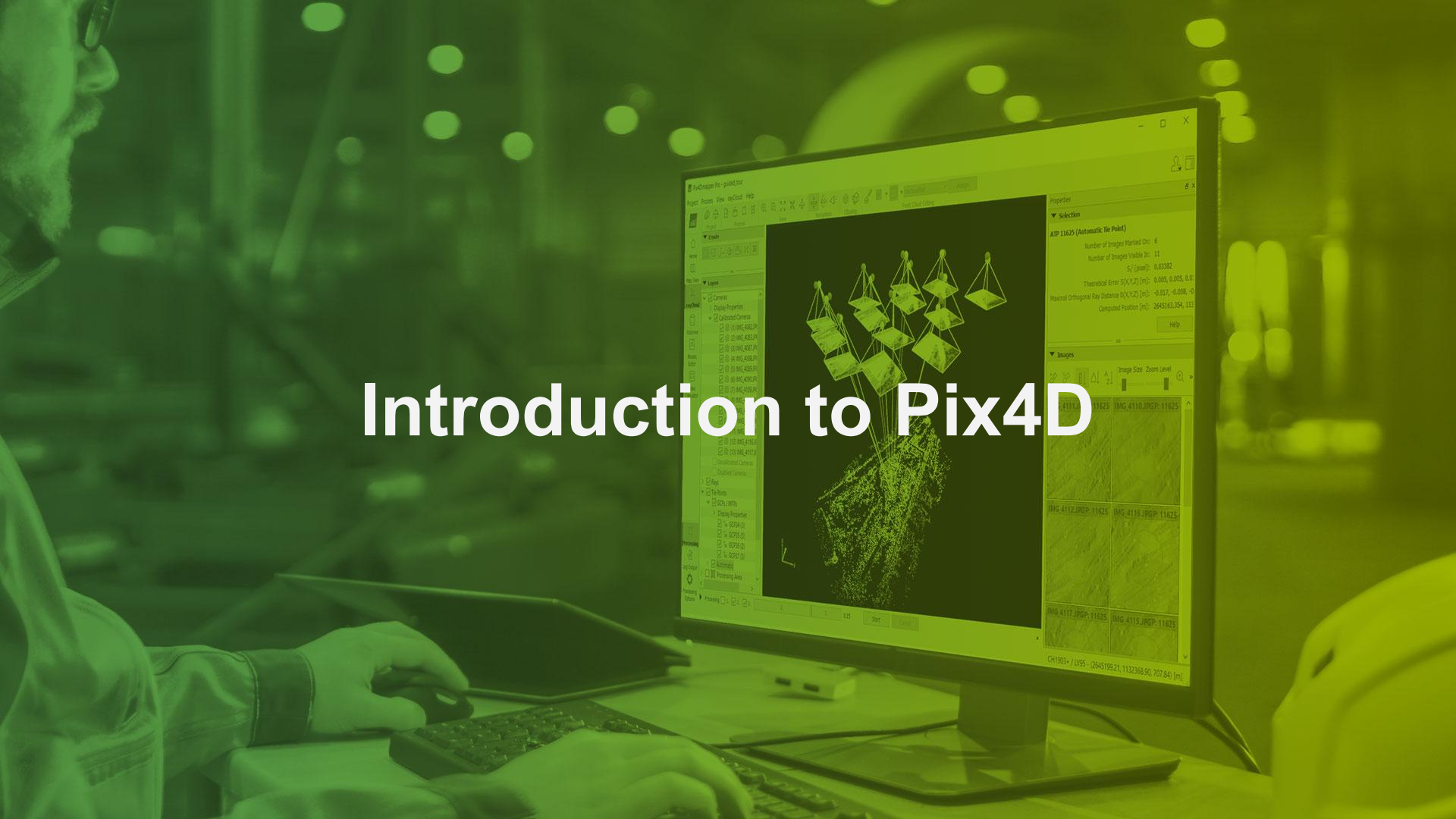
PIX4D

# Mining


Introduction to Pix4D

# About Pix4D

**8000+** active users per month
**100’000 acres** of reality modeled
**200+** countries & territories


SAN FRANCISCO **U.S.A.**

LAUSANNE **SWITZERLAND**

BERLIN **GERMANY**

SHANGHAI **CHINA**

MADRID **SPAIN**

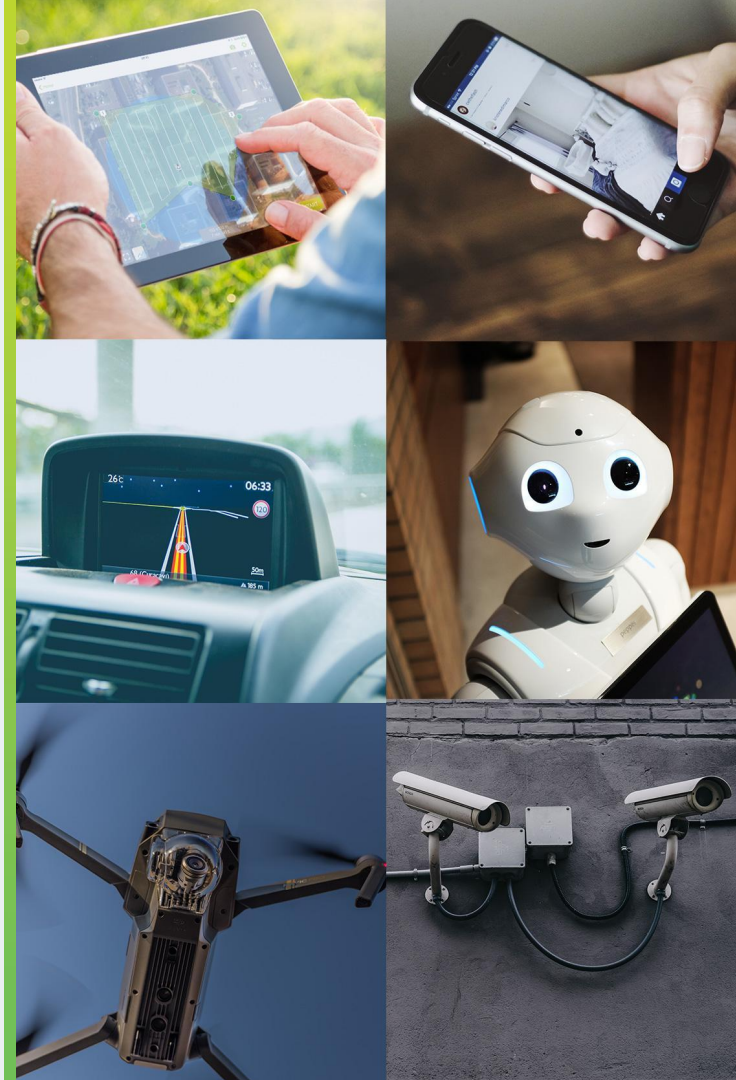
# 170 Resellers around the world

# The power of drones and photogrammetry

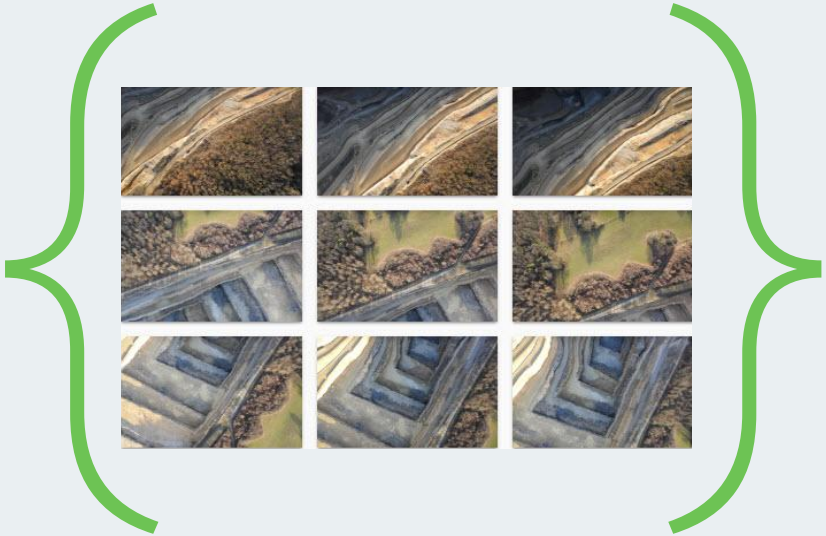
*“**44,354,881,622 Cameras** in the world by 2022, at minimum”*

**LDV Capital**

Pix4D generates accurate 2D and 3D information purely from images with cutting-edge photogrammetry technology



# What is it about ?



Information from images
for better and faster decisions

# What is photogrammetry ?

*“Evolution favours eyes that perceive the world in 3D”*

**Christoph Strecha**
Founder and CEO of Pix4D

# Integrated image based solution

## Mobile

- Data capture & review
- Field operations
- Flight management

## Cloud

- Processing & digitization
- Annotation & collaboration
- Data storage & management

## Desktop

- Processing & digitization
- Quality control over data & projects
- Ubiquitous

# Behind Pix4D technology

- **Accurate & robust,** images from any sensor, geometrically and radiometrically
- **A tool for professionals**, with innovative instructional approach, and unique tools for quality control
- Deep **scientific knowledge** of photogrammetry and how to mine meaning from images

# Mining

**Operational risk and compliance management**
- Aerial surveying & 3D mapping
- Drill & blast planning & topography engineering
- Asset & infrastructure inspections
- Geotechnical inspection & structure characterization

**Supply chain management**
- Stockpile management
- Production inventory
- Delivery forecasting

**Asset lifecycle management**
- Base mapping for site designing
- Site surveys during construction
- As built versus as designed comparison

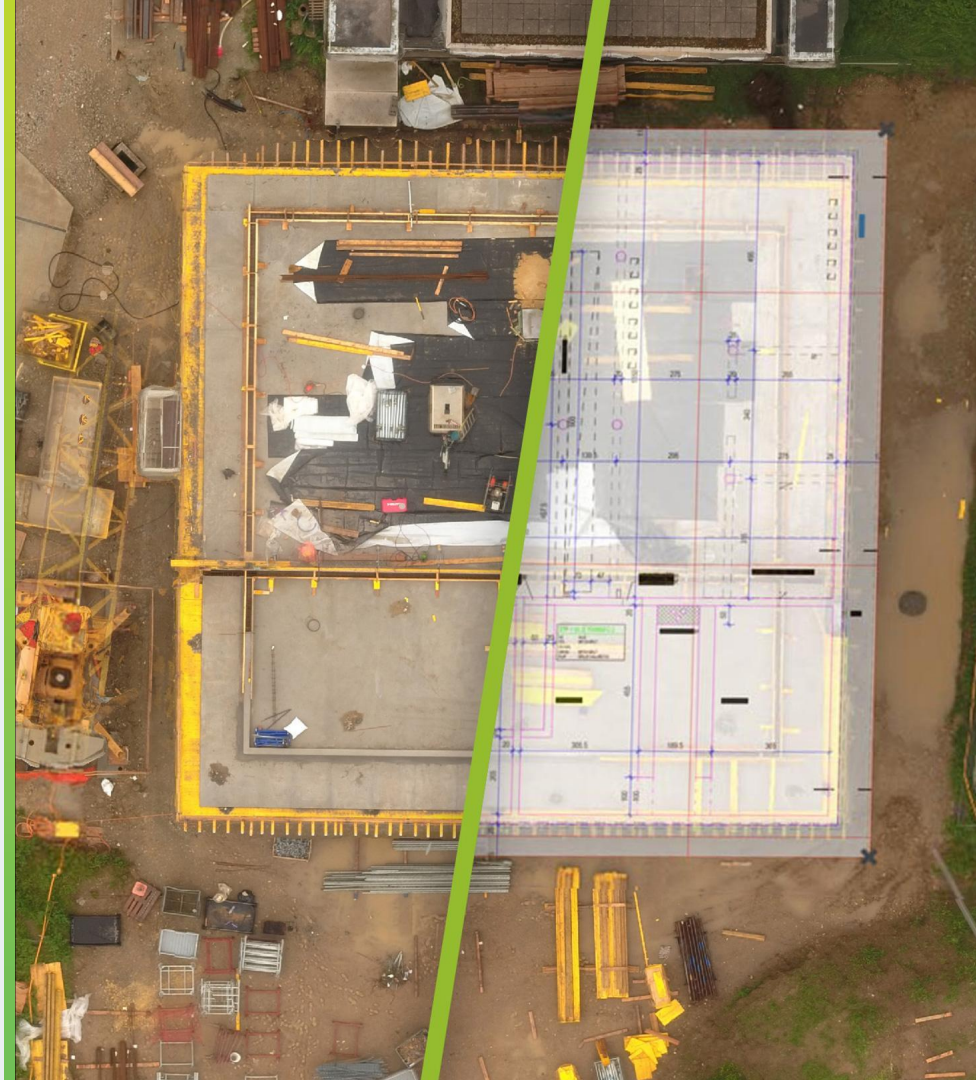
# Construction

**Earthworks management**
- Topographic surveys
- Stockpile measurements & cut/fill calculations
- Visual records of excavations

**As-built monitoring**
- Regular visual status reports of the as-built situation
- Site progress tracking against BIM project schedule and design
- Online project documentation for visualisation, measurement, annotation and sharing

**Inspection**
- Building & infrastructure inspections
- Online results with intuitive viewing/analysis tools

PIX4D



# Industrial inspection

**Digital database of industrial assets**

- All data is visually accessible in accurate 3D models
- Connect to ERPs and automation software for integrated workflows

**Frequent inspetions of assets**

- Roads
- Tunnels
- Turbines
- Refineries
- Cell towers
- Dams
- Airports


How does drone mapping
create value for mining operations?

# Pix4D is trusted by...

Many of the leading mining companies have already embraced Pix4D technology.

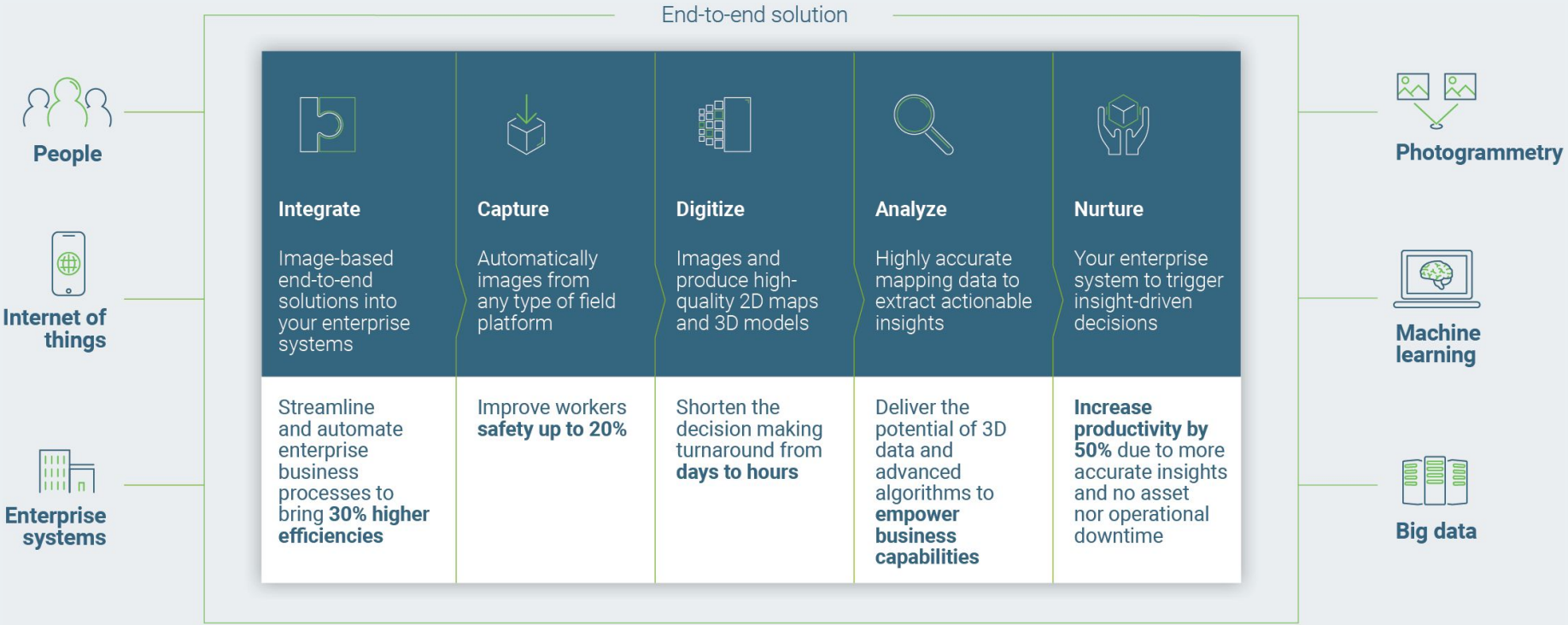









# End-to-end solution



# Five common uses of drone imagery in mining

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| **Transform Field Operations**<br><br>Traffic Management<br>Support Infrastructure<br>Inspection & Planning<br>Blast Planning<br>Asset Management and Surveillance | **Monitor Progress** | **Enable easy data sharing** | **Produce Accurate and Timely Volumetric Measurements** | **Environmental Monitoring** |

# Traffic management

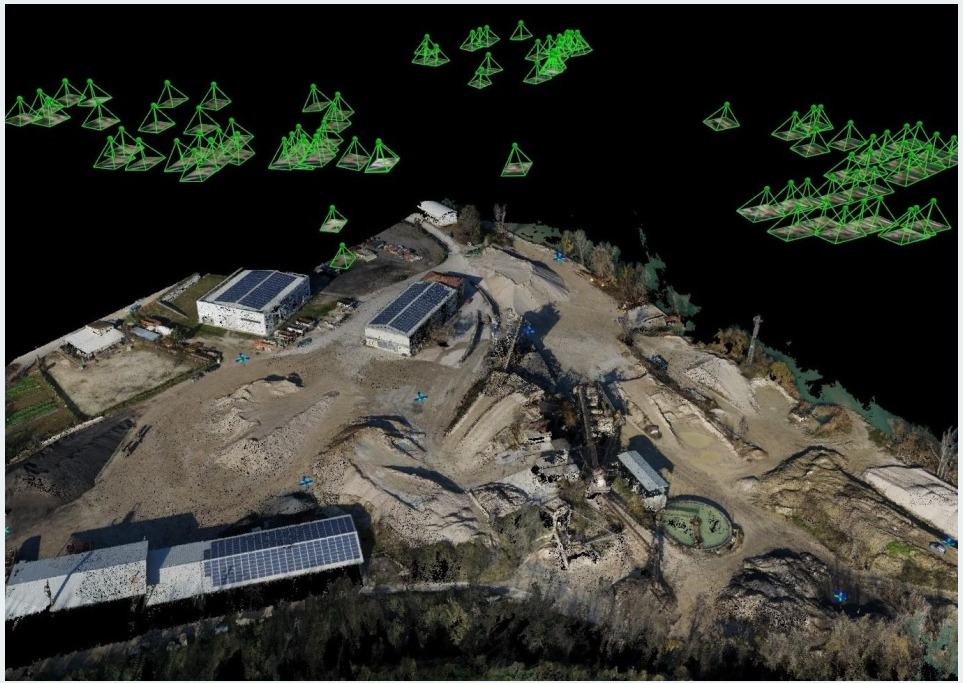
Optimize:

- Fuel consumption
- Haul roads design
- Stockpile locations

Generate updated haul road plans using interactive 3D polyline tool

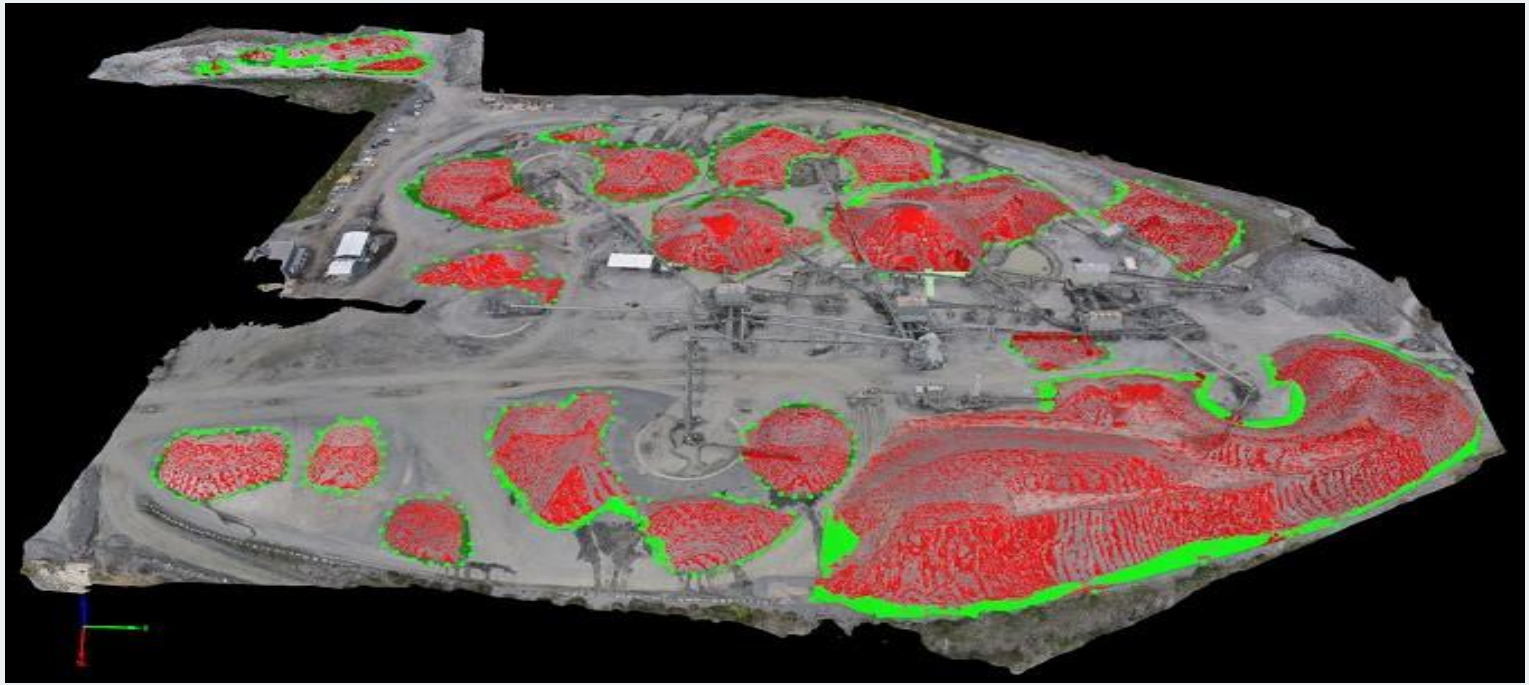
# Support infrastructure inspection & planning

Aerial data. Close to real time tracking. Access hard to reach areas



# Blast planning and monitoring

Lower cost. Safer work conditions. Higher accuracy

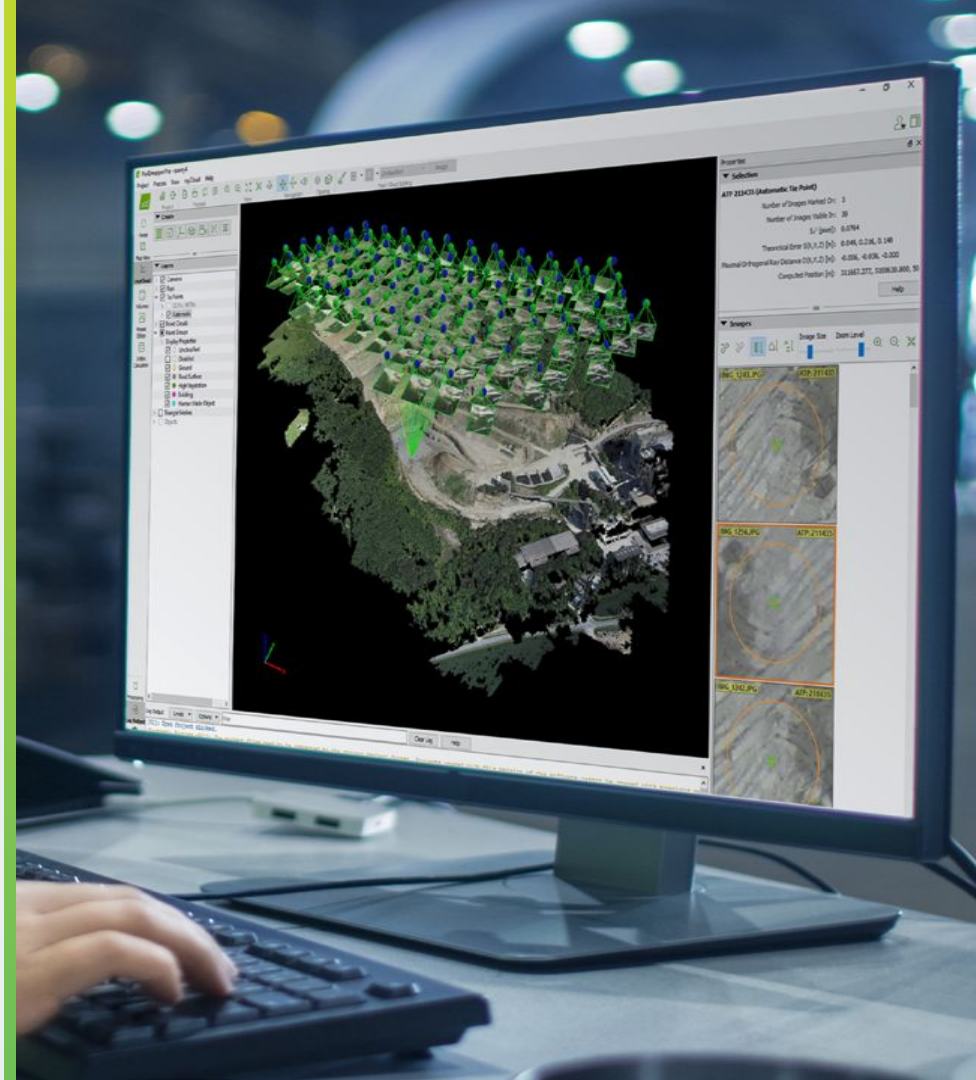


# Enable easy data sharing

Data products can be:

- Shared at anytime and anywhere
- Used in other software
- Annotated and commented

Empower on-site supervisors and management team with real time data



# Produce accurate and timely volumetric measurements

**Problem:**

- Accurate volume measurement and inventory management are two of the biggest challenges in the mining industry

**Advantages:**

- Flexibility to collect data quickly
- Faster and more efficient operations
- Drones are about half the cost compare to traditional ground-based volumetrics

**Benefits:**

- Higher profitability from more accurate volume measurements
- Improved safety and reduced risk on jobsites

# Stockpile inventory example

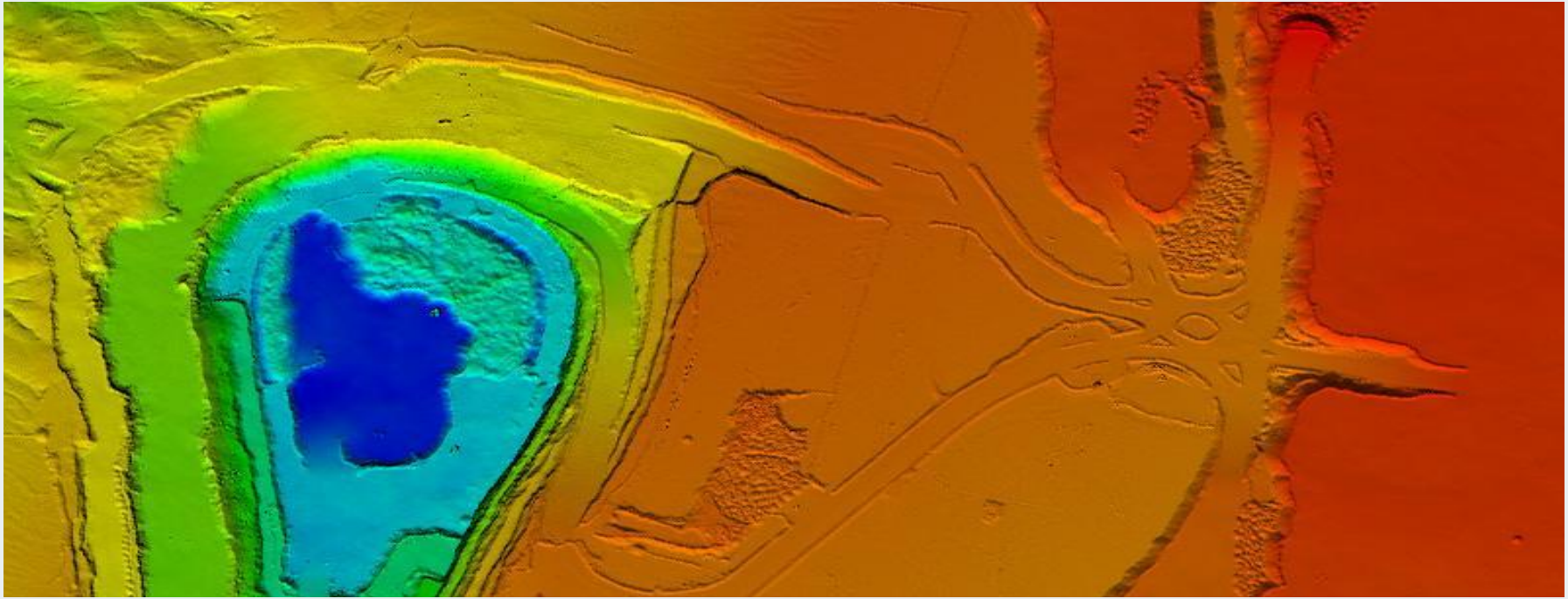
Photogrammetric survey with a fine ground sampling distance can achieve average error estimation from 2 to 5%

# Environmental monitoring

Monitor erosion and contamination for active and abandoned mining sites

# Use case

## Survey world’s 2nd largest uranium mine in Namibia

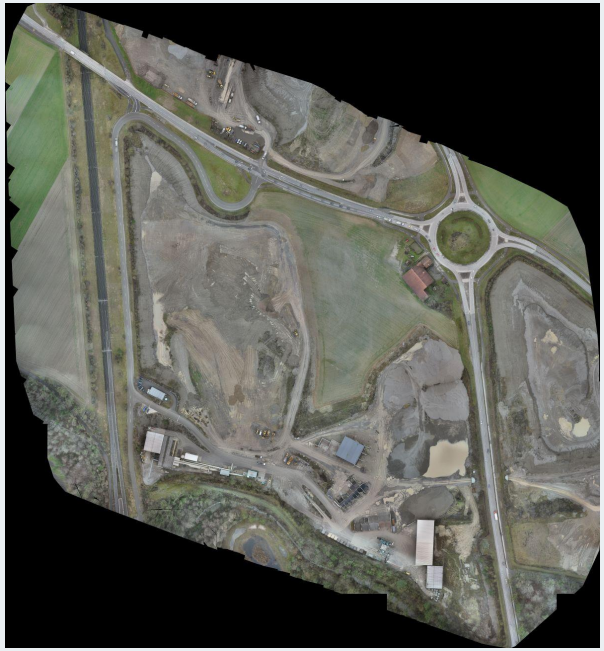


# Use case
## Survey world’s 2nd largest uranium mine in Namibia

| | |
|---|---|
| **Place** | Husab mine in the Namib Desert, Namibia |
| **Company** | Strydom & Associates Land Surveyors |
| **Size of the mine** | 15 sq.km (1500 ha) |
| **No. of flights** | 4 |
| **GSD** | 5 cm/px |
| **No. of images** | 1500 |
| **Flight height** | 390 m above ground |
| **Drone** | VTOL WingtraOne |
| **GCPs** | Yes |
| **Purpose** | Stockpile volumetric measurements for the year end audit and main mine surveying |

# **Use case:**
# Quarry survey in Switzerland

Orthomosaic



3D model of the mine

# **Use case:**
# Quarry survey in Switzerland

| | |
|---|---|
| **Place** | Haberland and Ziegli mines in Canton Zuerich, Switzerland |
| **Company** | Kies AG |
| **Size of the mine** | 20 ha |
| **GSD** | 0.97 cm |
| **Accuracy** | 1.3 cm horizontally, 2.3 cm vertically |
| **No. of images** | 946 |
| **Drone** | VTOL WingtraOne |
| **GCPs** | No |
| **Purpose** | Cost and revenue forecasting, operational planning |


Looking ahead…
Enterprise integration

# Enterprise integration unlocks higher value

- Fully integrate drone and image-based end-to-end solutions into the existing enterprise systems
- Achieve higher business impact in critical operations
- Seamlessly integrated into the existing ERP, field operations and data-driven business decisions


Thank you
www.pix4d.com