senseFly

senseFly
Mine & Quarry
360

**Driving decisions
from the sky**

> *"We knew the drone would be great for data collection, but what else could we use this for? And, boom, it's saving us money every single time we try something new."*

Joe Drew, Director of Technical Services, Vista Sand, USA

The time has come

When it comes to optimising the management of your quarry or pit, accurate geospatial data is key. Today, no tool comes close to providing such data as efficiently, or as safely, as drones (or UAVs/UAS).

With a single automated flight, a drone can collect timely, georeferenced imagery that is quickly transformed into a precise 3D copy of your site. Use this version to calculate volumes, perform site surveys, optimise traffic management, design road layouts and much, much more.

For companies who have yet to take to the skies, the senseFly Mine & Quarry 360 (featuring Airware) is the perfect starting point. This durable, globally-proven solution takes you all the way from point-and-click flight planning to actionable, shareable data. And all without ever stepping foot on a stockpile.

INSIGHTFUL

- Collect high-res, geo-accurate data
- Visualise & measure your site in digital 2D/3D
- Perform volume calculations & surveys, design road layouts, collaborate, report & more

EFFICIENT

- Dramatically reduce survey times & costs—capture site data in hours, not days
- Map even large open pits in one flight (cover 1,320 ha/3,260 ac per day*)
- Optimise inventory management by measuring stockpiles more frequently
- Ensure accurate results using cutting-edge eMotion flight planning software

CONNECTED

- Manage multiple sites from anywhere
- Grow your solution alongside your business— across sites, teams, users & geographies
- Re-use data within leading industry software

SAFE & SECURE

- Reduce worker risk by eliminating hazardous ground surveys
- Fly the lightest, safest UAV in its class
- Keep your data safe in the highly secure Airware platform

EASY

- Set-up your drone in under two minutes
- Achieve survey-grade accuracy without the need for bulky terrestrial instruments
- Track your site's evolution easily over time

*) Based on six eBee Plus flights of 59 min each (at 120 m/400 ft AGL).
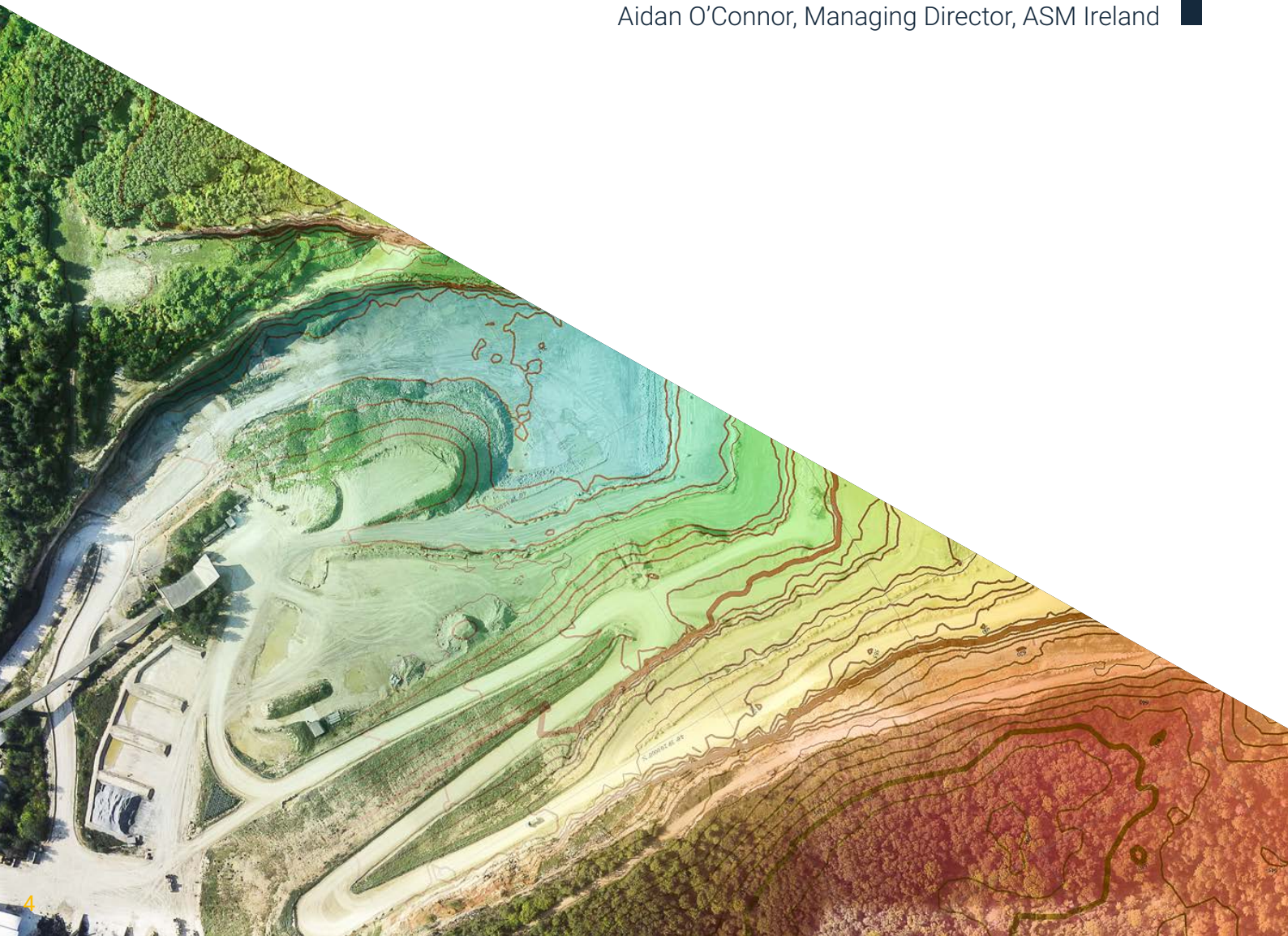
Accurate geodata in hours, not days

With senseFly's Mine & Quarry 360, collecting site data is virtually automatic. Simply define your quarry or pit's location on the map, launch the eBee Plus into the air, and the drone flies, captures high-resolution images and lands itself. You can then focus on using Airware's platform and powerful mining and quarry analytics to turn this data into action.

> *"For a single surveyor to get even close to the same level of detail as the drone using terrestrial methods would probably take upwards of two to three weeks"*

Aidan O'Connor, Managing Director, ASM Ireland

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Northern Front

Expected Extraction Volume
13827.92 m3 (Height: 12 m)

PLAN

- Define the site or area to map
- Choose & configure your high precision methodology (e.g. RTK using VRS)

CAPTURE

- Capture high-resolution, georeferenced RGB images
- Map up to 220 ha (540 ac) per day at 120 m/400 ft AGL
- Approx. 100x higher point density than traditional ground surveys

GENERATE

- Upload drone's georeferenced photos to Airware
- Create orthomosaics, digital surface/terrain models, point clouds, slope maps etc. for use in GIS, CAD & BIM software

ACT

- Conduct haul road & safety analysis, measure stockpiles, assess progress against plans, generate blast plans & collaborate with colleagues
- Integrate aerial data into design, engineering & maintenance workflows
- Export data to industry-standard software suites

From drone to decision

Track your inventory

- Fly eBee Plus to collect site data
- Process georeferenced imagery in the Airware platform
- Calculate cut & fill volumes or request automatic stockpile report
- Classify material types by site & date
- View a company-wide inventory dashboard sorted by date, volume, and material type
- Export reports (volumes, material types, tonnages & areas) to your ERP software of choice

Improve traffic management

- Access powerful haul road analytics
- Optimise design of haul roads, loading floors, stockpile locations etc.
- Assess condition/slopes of haul roads/loading floors
- Ensure compliance & operational safety

Collaborate seamlessly

- Collaborate with stakeholders within a secure environment
- Improve operational planning, depletion accounting & environmental monitoring
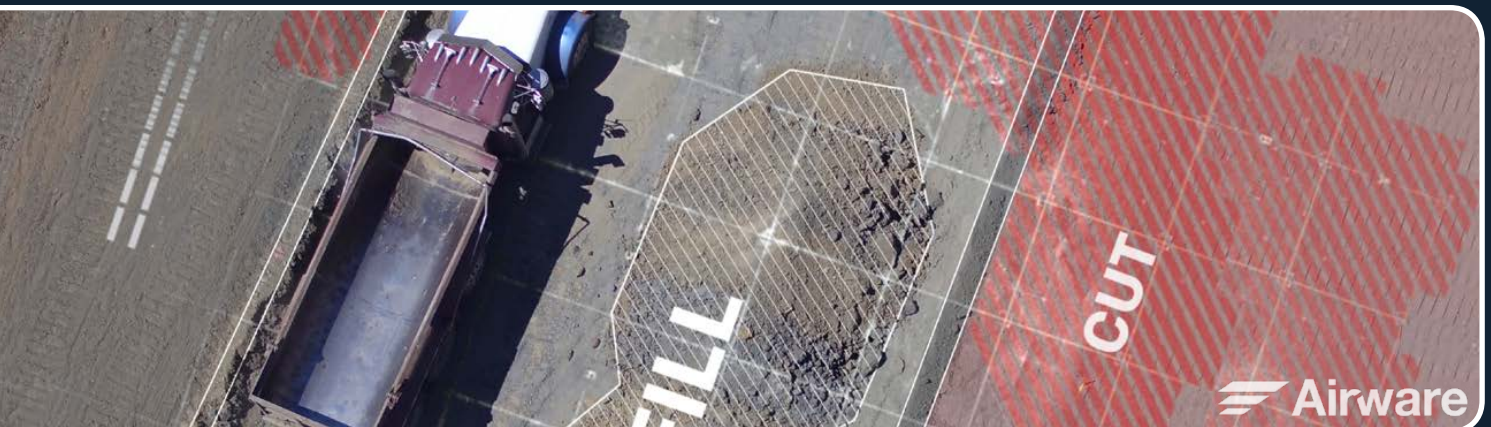- Identify required maintenance work

Bringing high-resolution, georeferenced eBee Plus images into the Airware platform enables a world of accurate, data-based decision making. Once these images have been processed—to create your orthomosaic, digital models, point cloud and more—use the powerful Airware platform to analyse, share, and collaborate around your data.

Survey frequently

- Survey your site, or sections of it, whenever required
- Compare analytics from new & past surveys to visualise changes
- Reduce your survey team's time on-site
- Visualise your site in 2D & 3D
- Export high-res data products incl. point clouds (.las), orthomosaics (.tiff) & unfiltered contour lines (.dwg)
- View data in your preferred site planning software

Ensure compliance

- Help improve workforce safety across your job site
- Help avoid regulator-driven shutdowns or fines
- Increase office reviews to lower in-pit inspections
- Help improve regulatory & community relations

End–to–end intelligence

senseFly's Mine & Quarry 360 is a complete aerial site analysis system. The accurate and timely geospatial data the eBee Plus collects, combined with Airware's powerful platform and industry-focused analytics, creates a unique decision-making tool.

This tool provides the detailed insights you require to improve your site and inventory management, provide quick, accurate reporting, and communicate more effectively, both inside your business and externally.

eMotion
Drone flight & data management. Reimagined.

✓ Simplicity meets power
Beginner-friendly, yet packed with advanced features to optimise results

🔗 Flexible
Choice of flight modes, assistance features & mission planning blocks to suit every application

📦 Full 3D environment
For safer flights, consistent performance & improved data quality

⸽ Connected
eMotion connects to your drone, desktop & cloud software, survey-grade base stations, weather updates, airspace data & more

Included in Mine & Quarry 360:

eBee Plus drone
- Flies for 59 min
- Survey up to 220 ha (540 ac) at 120 m/400 ft AGL
- High-Precision on Demand (RTK/PPK)—for absolute accuracy down to 3 cm (1.2 in)
- senseFly S.O.D.A. photogrammetry camera

eMotion software
- Simple mission-block flight planning
- 2D/3D interface options
- Connect to cloud services, weather updates, airspace data etc.
- Instant integration with senseFly GeoBase (& compatible with leading base stations)

Airware platform
- Create georeferenced orthomosaics, point clouds, surface models & more
- Access industry-specific modules for analysis & reporting
- Accessible anytime, anywhere
- Easily collaborate across multiple sites, teams & geographies

Education & support
- Full access to Knowledge Base, regular customer webinars, video tutorials & more
- Lifetime hardware & eMotion support
- Expert local senseFly representatives

Proven ROI across multiple applications

senseFly's eBee is the industry's most widely used mapping drone platform, with thousands of satisfied commercial operators around the world. This durable tool combines seamlessly with Airware's powerful cloud platform and advanced analytics to create a uniquely focused and powerful site analysis solution. A solution that helps users collect the geospatial data they need, safely and efficiently, and to turn that data into actionable insights.

> *"This is great for surveyors ... they can spend less time collecting data and more time using it. This technology also allows us to survey areas that were previously too dangerous to send anyone into."*

Iain Allen, Senior Manager of Geographic Information Systems, Barrick Gold

Over $100K
Canada
Mineral exploration
Savings versus airborne LiDAR surveying[1]

<24 hr
Ireland
Quarry monitoring
Turnaround time for 'virtual copy' of quarry[2]

30%
USA
Silica sand production
Reduction in fuel costs through improved stockpile management[3]

5x
France
Aggregate volume calculation
Reduction in survey costs vs. terrestrial measurement[4]

7 cm
Chile
Copper mine survey
Avg. ground sampling distance achieved over 3 km radius site[5]

"An unprecedented level of accuracy"
Oman
Micro-gravity survey
Operator comment following exploration survey of a chrome ore mine[6]

15 min
Dominican Republic
Gold mine surveying
Drone survey duration vs. 5 hrs laser scanning[7]

4 months
Tanzania
Cement production
Breakeven point of two eBee survey drones[8]

[1] goo.gl/oYKmTx, [2] goo.gl/2rEjWN, [3] goo.gl/IJ3Yef, [4] goo.gl/eNhvVk [5] goo.gl/UQsZKa, [6] goo.gl/Cku3AK, [7] goo.gl/oHwTxm, [8] sensefly.com/videos/lafarge

Learn more at www.senseFly.com

At **senseFly**, we believe in using technology to make work safer and more efficient. Our proven drone solutions simplify the collection and analysis of geospatial data, allowing professionals in surveying, agriculture, engineering and humanitarian aid to make better decisions, faster. senseFly was founded in 2009 and quickly became the leader in mapping drones. The company is a commercial drone subsidiary of **Parrot Group**.

Airware provides end-to-end solutions that enable enterprises to digitize their business and turn aerial data into actionable business intelligence. These solutions are available via the global network of Cat dealers, who are transforming work sites with commercial drones and data analytics. Visit www.airware.com