

Ai Driven 3D Blast Movement Software



POWERED BY



PEOPLE  
TECHNOLOGY  
METHODOLOGY



**Artificial Intelligence**  
+  
**Human Experience**  
=  
Dynamic Business Solutions

**ARTIFICIAL  
INTELLIGENCE**  
Saving up to \$10m  
per year per mine

## AUGMENT TECHNOLOGIES

Augment is at the forefront of the Artificial Intelligence Convergence.

We are an innovative technology company that specialises in Artificial Intelligence (AI), the Internet of Things (IoT) and Blockchain. We create value for our clients by developing solutions to complex high value problems that our clients (as non-AI specialists) can't solve by themselves.

We leverage our proven expertise in people, technology and methodology to develop products, and offer services that augment our clients, by providing an AI capability to their business.

Proudly West Australian and encompassing a global team of AI specialists. Our team of experts have extensive experience in delivering practical services and products in Australia, Africa and the Americas.

The Mining sector has many opportunities to realise significant value from AI, IoT and Blockchain. From exploration to mine closure, from pit to port and across the mining value chain, we have a proven methodology to develop, deploy and support practical technical solutions that are commercially lucrative.

If you are in management, geology, planning, engineering, production, drill and blast, metallurgy, digging and hauling, processing and beneficiating, health, safety and environment to name a few, call us to discuss how we can augment your business.

## AI DRIVEN 3D BLAST MOVEMENT SOFTWARE

Accurately understanding and modelling blast movement is a complex, high value problem for mining companies.

Even with the application of best practice, accurately predicting the dilution, ore losses and mixing within a muckpile has been indicative at best.

Blast movement impacts many functions throughout mining operations, playing a critical role in mine planning, geology, drill & blast, survey, load and haul, and processing.

For decades now, open pit mining operations have been forfeiting hundreds of thousands of dollars a day by not optimising their blast movement technology. While these losses are well understood, such costs have proven challenging to avoid, despite the best efforts of mining personnel.

Augment have created a solution that empowers mining personal to reduce the costs and consequences of blast movement. Ore Movement Policy (OMP) is a software only, AI driven 3D solution to blast movement prediction and modelling.

Accurately understanding dilution, ore loss and mixing after a blast enables operations upstream and downstream to make better decisions based on information that until now has not been available.

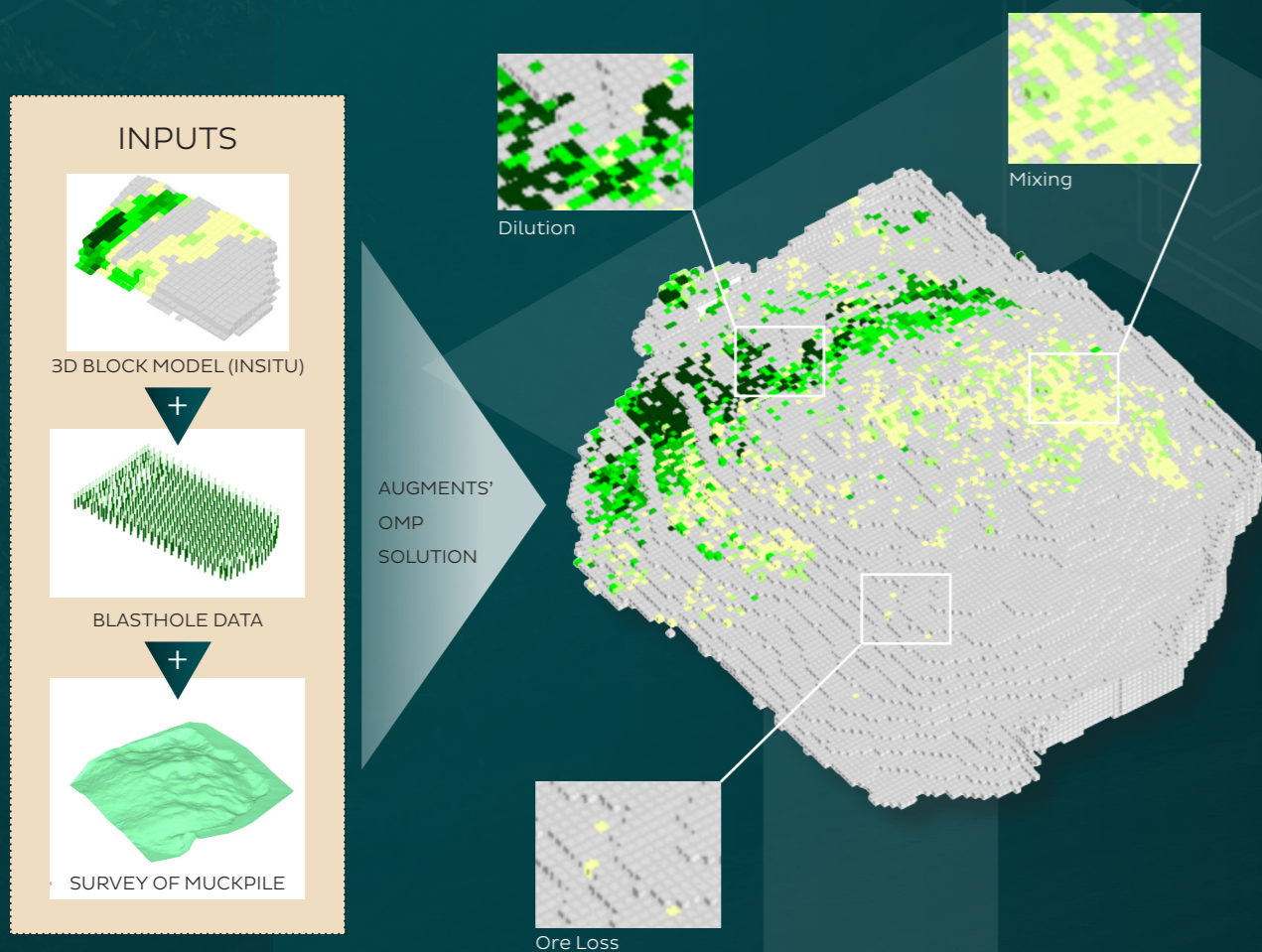




## A 3 IN 1 SOLUTION TO DILUTION, ORE LOSS, AND MIXING

Using the in-situ block model, blasthole data, and survey pickup, Augments' OMP solution generates a 3D post-blast block model.

The post-blast block model respects the overall tonnage and grade of the in-situ model, and grades are redistributed into the post-blast volume at high resolution and accuracy. Dilution, ore loss, and mixing at the blasting stage can now be modelled at high resolution and understood in detail.



## SOLVING DILUTION, ORE LOSS, AND MIXING IN 3D DILUTION CATCH THE QUIET THIEF

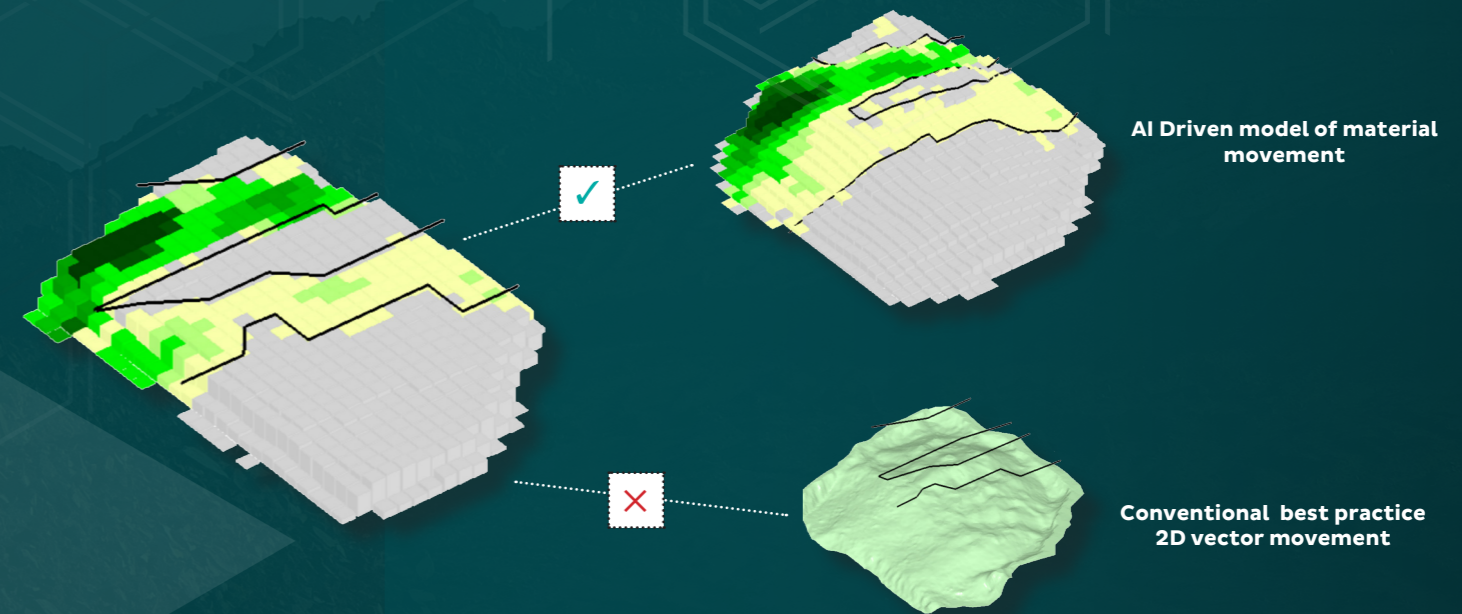
When waste material is taken in the process of ore extraction, it results in money and time spent on material that has little to no value to the operation. OMP provides you with the information required to minimize and better understand your contact, internal, and mining dilution.

## ORE LOSS – MAXIMIZE REVENUE

Ore material and its value is lost once sent to the waste dump. OMP tells you where this material is in 3D post-blast ensuring your metal goes to the right place.

## MIXING – SEE YOUR PLANS TO IMPROVE PERFORMANCE REALLY WORK

Material types are often defined using different criteria and expected production performance. The criteria are mine-specific and separations can be based on rock type, grade thresholds, degree of weathering and oxidation, levels of deleterious elements or minerals, material hardness, and more. OMP allows you to understand the degree of mixing at block scale in 3D and throughout the whole blast. Misclassification is avoided and the mine can make informed plans that work as expected.



## KNOW WHAT YOU ARE MARKING OUT THE NEW BEST PRACTICE

Previous practice involved marking out the in-situ block model using strings or polygons. During blasting material moves and these outlines no longer accurately delineate the ore. In efforts to account for this, 2D adjustments using a few vectors were often made - markout outlines were typically nudged horizontally in the major direction of throw. This approach is indicative and fails to account for many significant considerations. Mining teams remained in the dark about how much dilution and ore loss still occurred in each blast until discrepancies were reported.

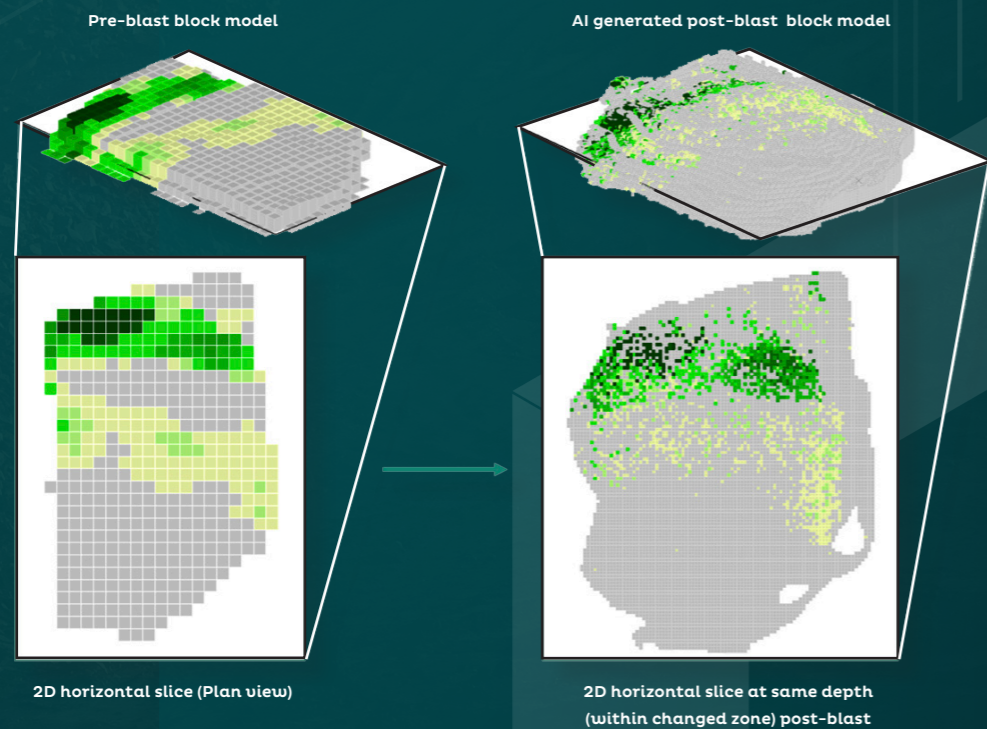
OMP changes that. Using hundreds of thousands of vectors and the movement is modelled at high granularity and in all directions. All block model, geological and economic factors can be considered. Dilution, ore loss, and mixing are understood and a new post-blast markout is created based on better information that is important to you. A balance between tonnage and grade demands can be decided on during this new markout, so you dispatch what you plan to plant, stockpile and waste.



# OMP – THE BETTER, EASIER, TRANSPARENT AND BEST PRACTICE SOLUTION

Using hundreds of thousands of vectors, blast movement is defined in 3D and a 'moved' post-blast block model is created.

- Robust machine learning algorithms ensure movement considers all important variables specific to your mine – blasts parameters, rock characteristics, structures etc.
- Results are continuously validated, providing feedback to ensure algorithms learn how your specific material moves for your blast designs, even as parameters change over time. No more one-size-fits-all approximation – accurate results for your mine.
- Software driven approach – once standard geology, blast, and survey data is collated the site-specific algorithm will process results in minutes. No more inconvenience to operations.
- Our system will integrate with yours – geology, drill and blast, survey and planning, we will fit in with your existing setup.
- Results are communicated in a customisable interface, tailored to the needs of all stakeholders. Transparent easy-to-understand reporting helps engage all teams in understanding how all material can be sent to the right place.
- Remote deployment – our software only solution means that no site visit is required to implement, optimise and support OMP.
- Opens the door to exciting new digital opportunities such as virtual 3D mining and live reconciliation.



Real-life example of validating the AI generated post-blast block model against the pre-blast model. Movement of material should respect real-life scenarios and variability within the blast area.

**General Manager**  
Reduce costs and risks, increase productivity and profits

**Geology**  
Measure the improvement in Mine to Mill Reconciliation

**Planning**  
Make the most informed decisions for your mine in real time

**Drill/Blast**  
No more surplus drilling, use feedback to optimize designs

**Survey**  
Safely and efficiently capture each blast

**Dispatch**  
Send the right material to the right place

**Mining**  
Bring the right material to the right place

**Metallurgy**  
Receive more of what you want!

**HSE**  
Safer Operations, no people on the muckpile



# Next Generation Mining Solutions

Augment Technologies exist to build a future that sees people and technology working together for the greater good of humanity, to produce complex high-value solutions that neither could achieve alone.

Let us help Augment your business with a customised solution that creates value, productivity and insight for your business.

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