

10 questions you wanted to ask about Implicit modelling



Author's name Mitrofanov Alexander

Resource geologist



www.srknordic.com

Implicit Modelling (IM) techniques have become the industry standard for geological surface modelling over the last decade. Improved time efficiency, visually more pleasing shapes of geological features and ease of dynamic updating are among the reasons for the success of this technology. This overview provides an insight into some of the guidelines, terminology and basic techniques.

1 | What is IM?

IM is a revolutionary new method in wireframing for any purpose: geological, geotechnical, hydrogeological, mining and many others. In comparison with classical (explicit) approach it works better, is faster and is also much more flexible in terms of dynamic updating and editing.

2 | How does it really work?

Mathematically IM is just an interpolation procedure based on Radial Basic Functions (RBF) and is very similar to kriging or inverse distance processes in terms of calculation results. The main difference is the speed of calculations: RBF works much faster, which allows editing and updating models in real time.

After interpolation has been completed, it becomes a source for creating wireframe shells, which constrain the necessary volume based on the interpolated values. Different types of these values predetermine the variety of modelling methods.

3 | What methods exist in IM?

In spite of the same math algorithm used for all interpolation procedures, three main initial data types are normally considered:

1. Grade composites are the source for grade shells. This method is not very widespread and used mostly for preliminary modelling.
2. Contact points between different lithological or any other discrete data types. This is the most reliable and flexible method used for resource and/or lithological domaining.
3. Volume points method. An additional method for lithological modelling.

4 | Does IM produce “bubbles”?

No. Bubbles as interpolation bulge is just an indicator that initial data has not been properly constrained.

Normal and reliable implicit wireframes do not contain bubbles. If you see them in your model it typically means that somebody has made a mistake!

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NOTHING IS STRONGER
THAN AN IDEA WHOSE
TIME HAS COME

Victor Hugo

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5 | Is it really fast?

Yes. The exact time for wireframing procedure greatly depends on the complexity of the object and the level of detailing, but typically modelling time is cut by between 3 to 10 times in comparison with an explicit modelling approach.

6 | Can IM be used for Mineral Resource Estimation?

Yes. A Mineral Resource can be stated based on the geological model whose wireframes were built through an IM approach.

7 | Is it difficult to learn?

Yes. In spite of the presence of often very user-friendly interfaces in the most popular software products, which hide the mathematics from operator, it takes several weeks to learn the basic modelling principles, several months for advanced principles and a couple of years before being able to create wireframes of significant complexity. However, taking into account the advantages of IM implementation, is it worth it? Yes.

8 | What software can be used for IM?

Most of the major mining software companies are developing their IM modules. These are Gemcom, CAE, Maptek and some others. Currently Aranz GEO is in a leading market position with their Leapfrog software product.

9 | Is it easy to make a mistake?

Yes. IM applies several complicated algorithms in a dynamic updating environment so there is a strong advantage if an experienced operator supervises the modelling process or reviews the final result. A good understanding of the underlying geology and modelling processes are in key building a robust model.

10 | What else must be taken into account?

The most important rule “rubbish in – rubbish out” related to any modelling processes is true for IM as well. An understanding of the quality of the source data is vital, particularly considering the high number of automated processes.

Contacts

If you would like further information, visit us at FEM, booth B20.



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Alexander Mitrofanov MSc, PhD, MAusIMM

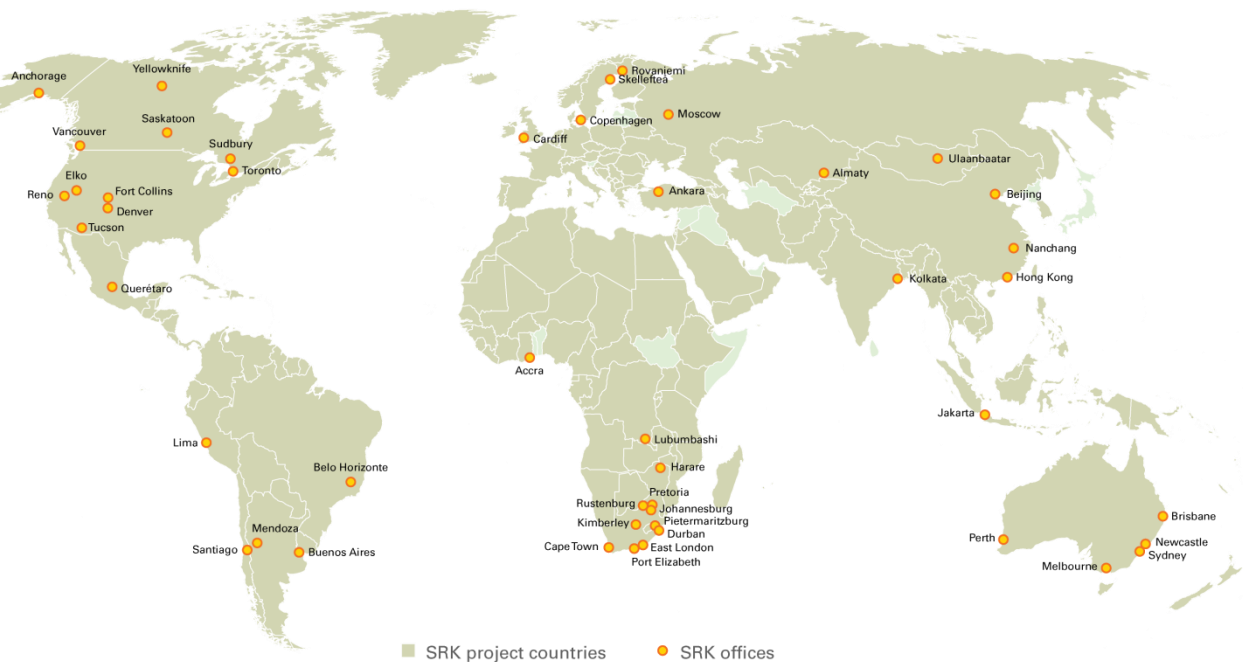
Resource Geologist

Tel: +46 (0)910 545 90;

Mobile: +46 (0)70 4554 590;

Email: amitrofanov@srknordic.com;

Skype: mit-alex



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