

Conceptual Mine Design Proposals for Mining Lunar Water Ice

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TUKS MINING



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Mining Specialists from lapTOP to pit BOTTOM

Thanks



Me

- Mining Engineering Post-graduate
- Space Resource Contribution
- Master's study in Lunar Mining
- Oblivious South Africa



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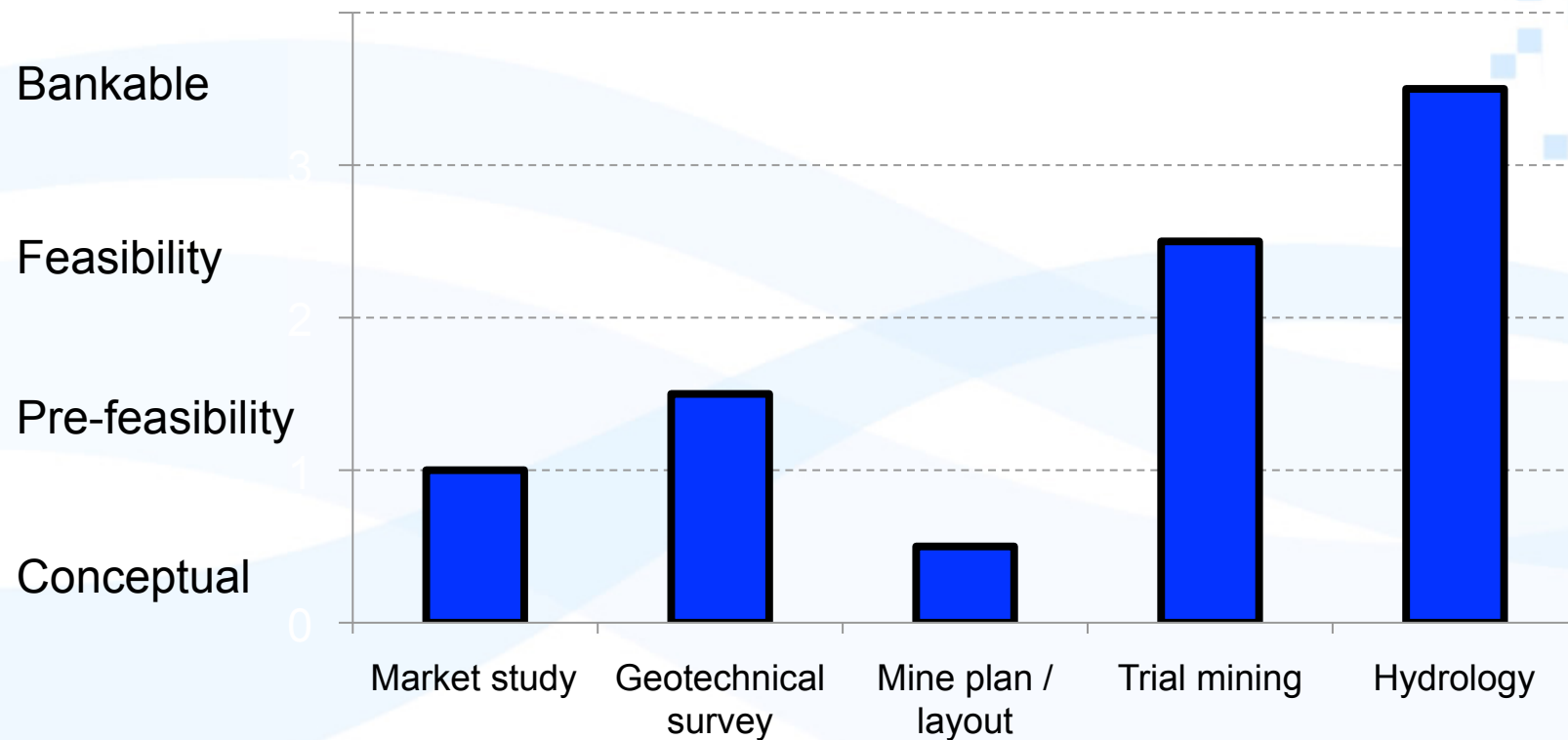
Agenda

- Big picture:
Master's proposal
- “Small” picture:
gravity transport layouts for
lunar water ice mining



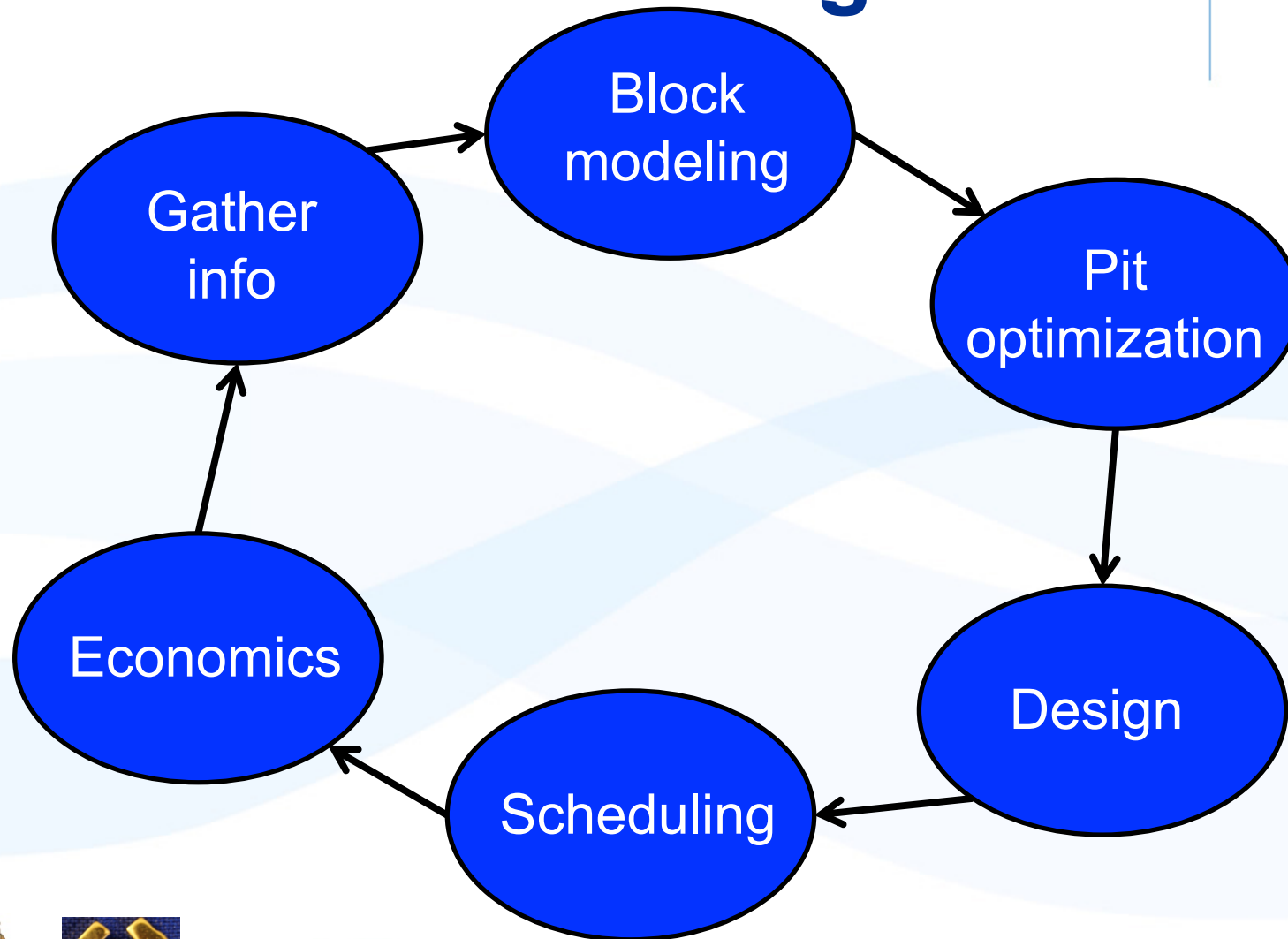
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Objectives of Master's study



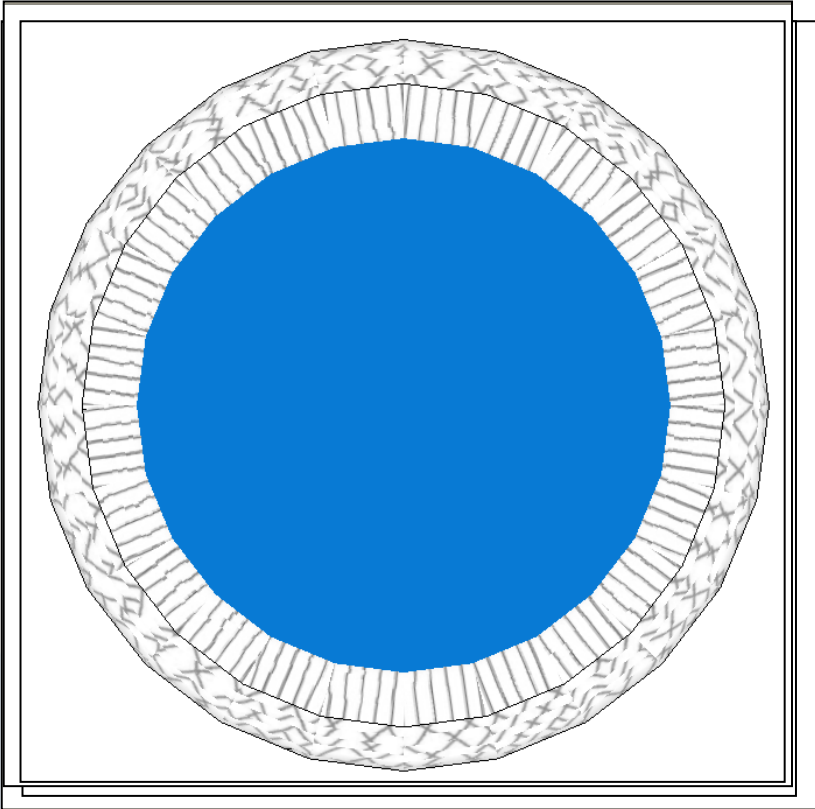
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Surface Mine Design Process



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Gathering info – orebody

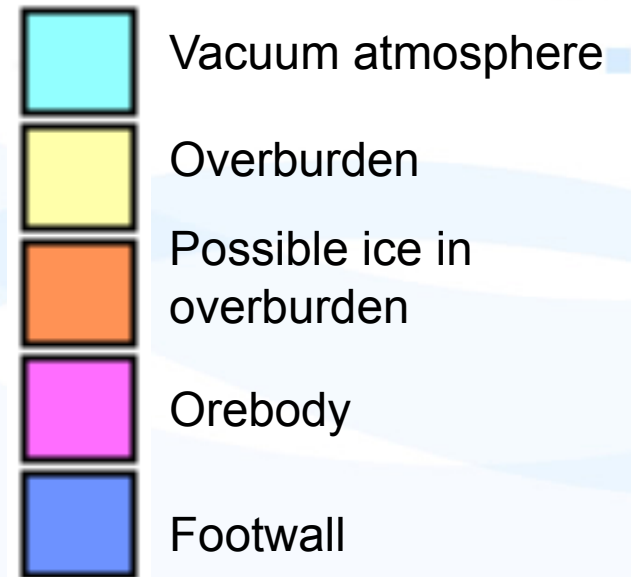
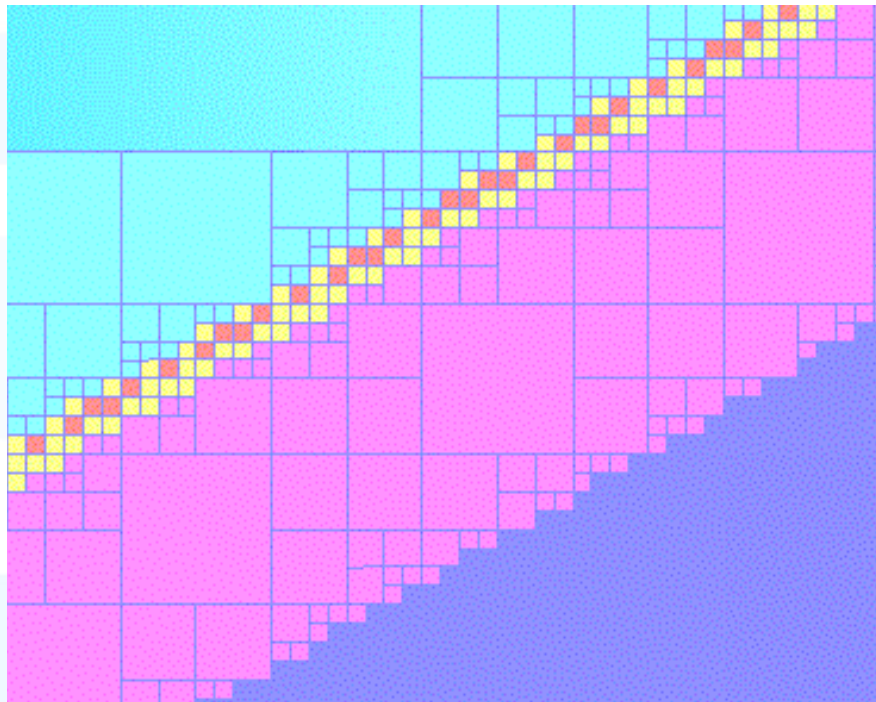


- Size: 2-15km
- Thickness: 2m
- Grade: 90%
- Overburden: 0.5m
- Dip: $>30^\circ$, flat at bottom



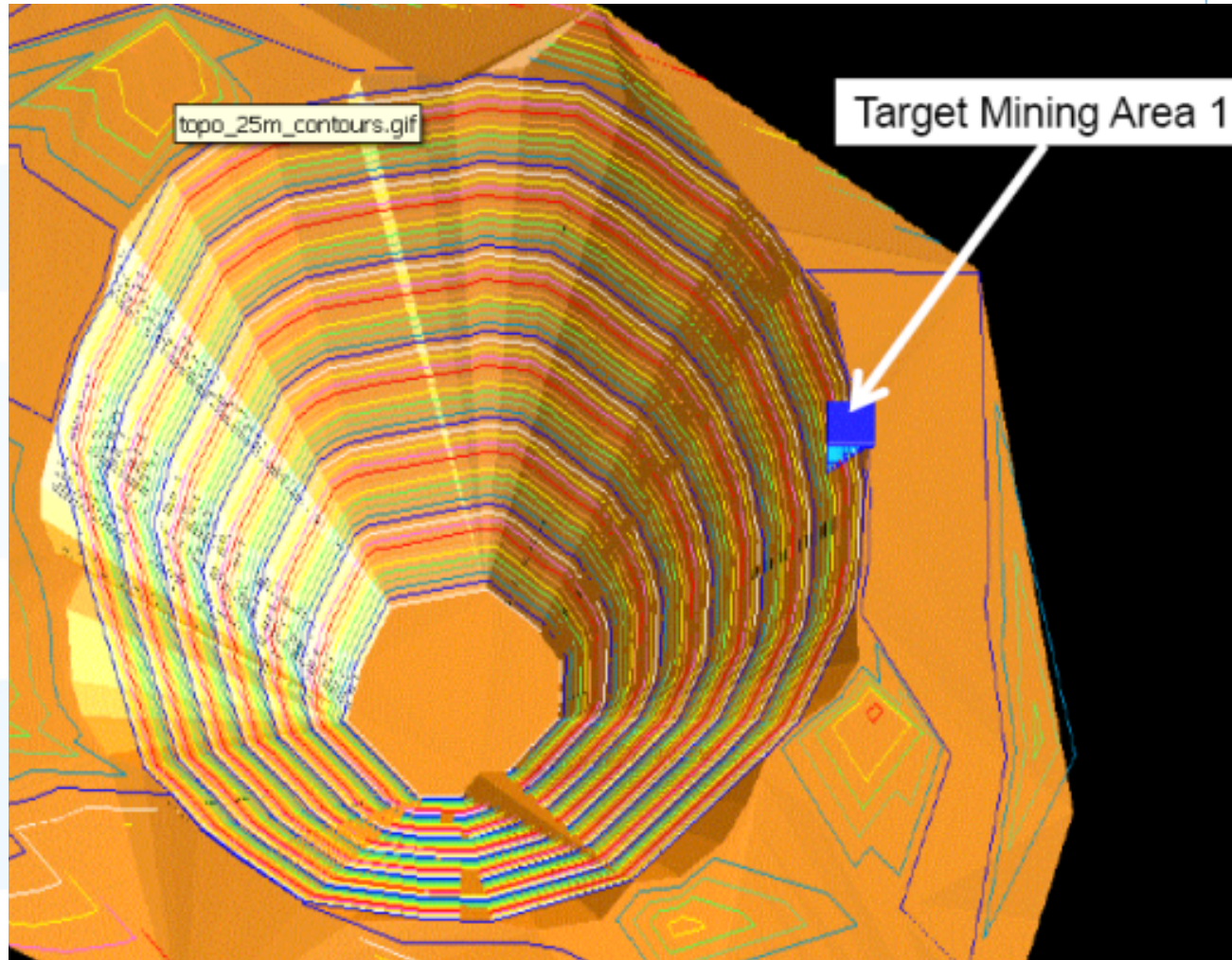
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Geological block modeling



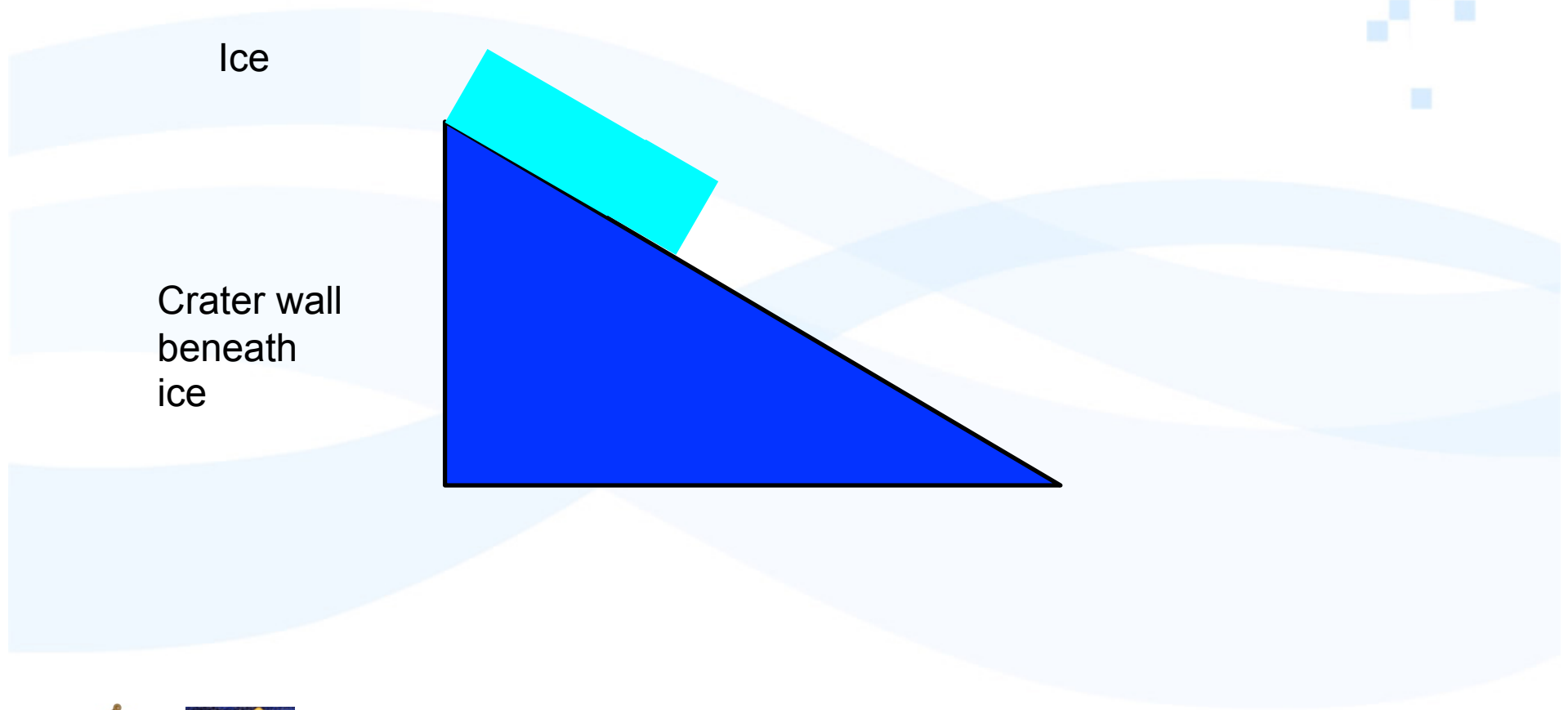
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Geological block modeling



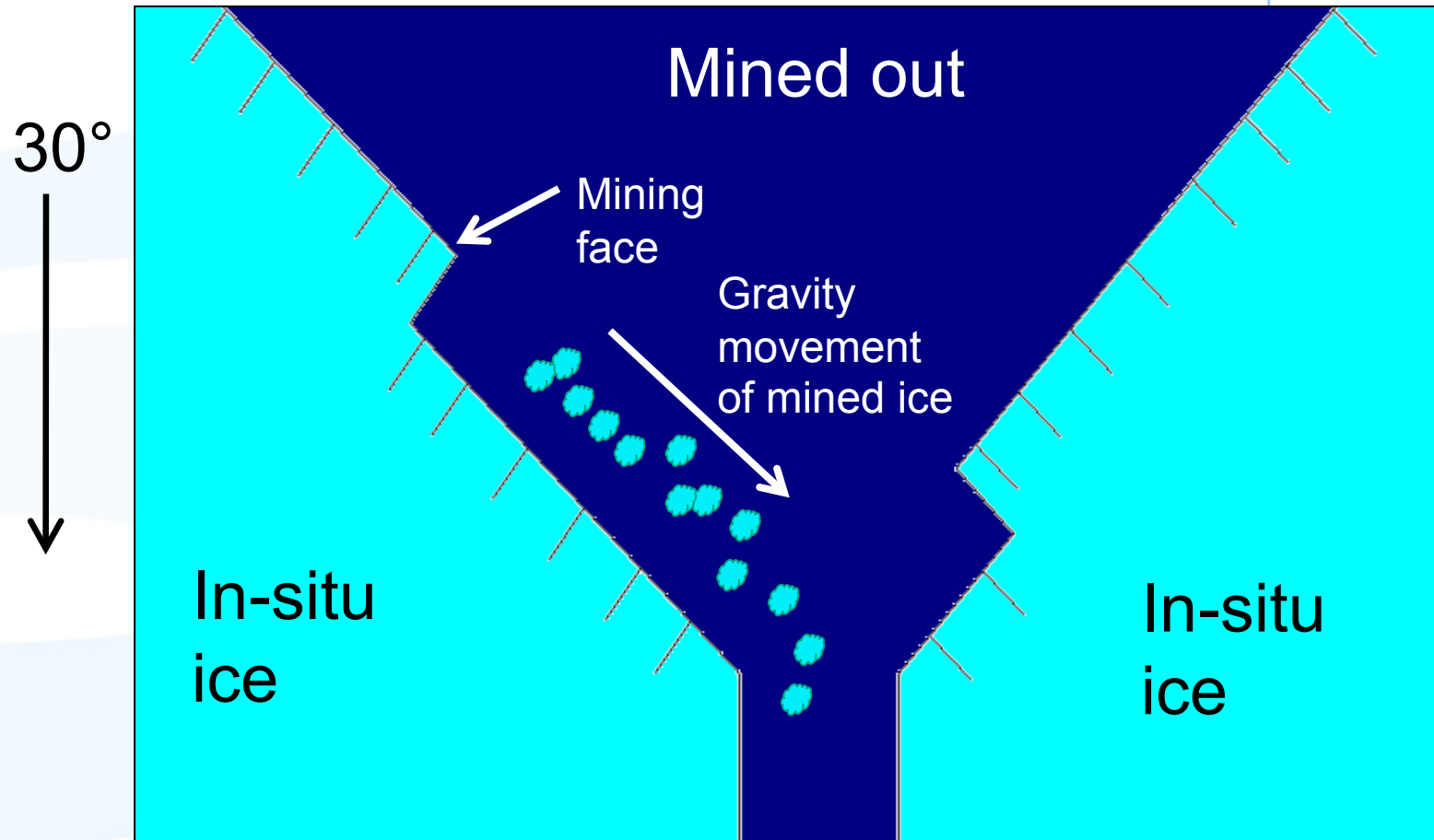
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Gravity transport



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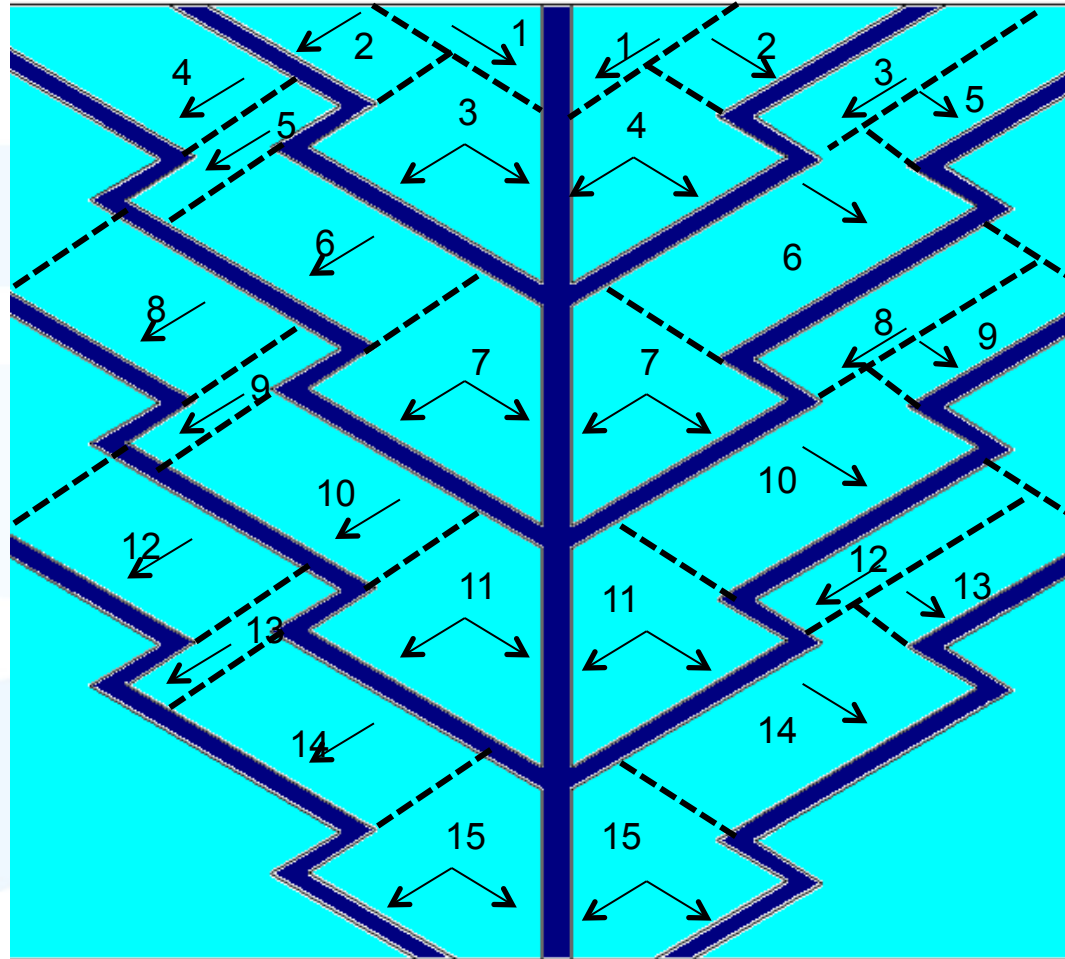
Simple gravity transport



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“Orepass” transport

30°



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Caving transport

30°



The diagram shows a cross-section of a caving transport system. A large, dark blue, irregularly shaped mass represents the material being transported. This mass is contained within a light blue frame that has a 30-degree angle on its left side, indicated by a vertical arrow and the text '30°'. The bottom of the mass is filled with a pattern of small, light blue circles, representing the caving material. The entire system is set against a light blue background with wavy lines.



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Influencing factors

- Ice or snow
- Fragmentation
- Orepass angles
- Trench life time
- Safe distance
- Risk of overflow
- Production rate



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Conclusions

- Proposed M.Eng framework
- Lunar ice as orebody
- Gravity transport concepts proposed; need development
- Gravity transport can increase lunar outpost feasibility



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Questions / discussions



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