

LUNAR ORBITAL REMOTE SENSING FOR ISRU: HELIUM-3 TEST CASE

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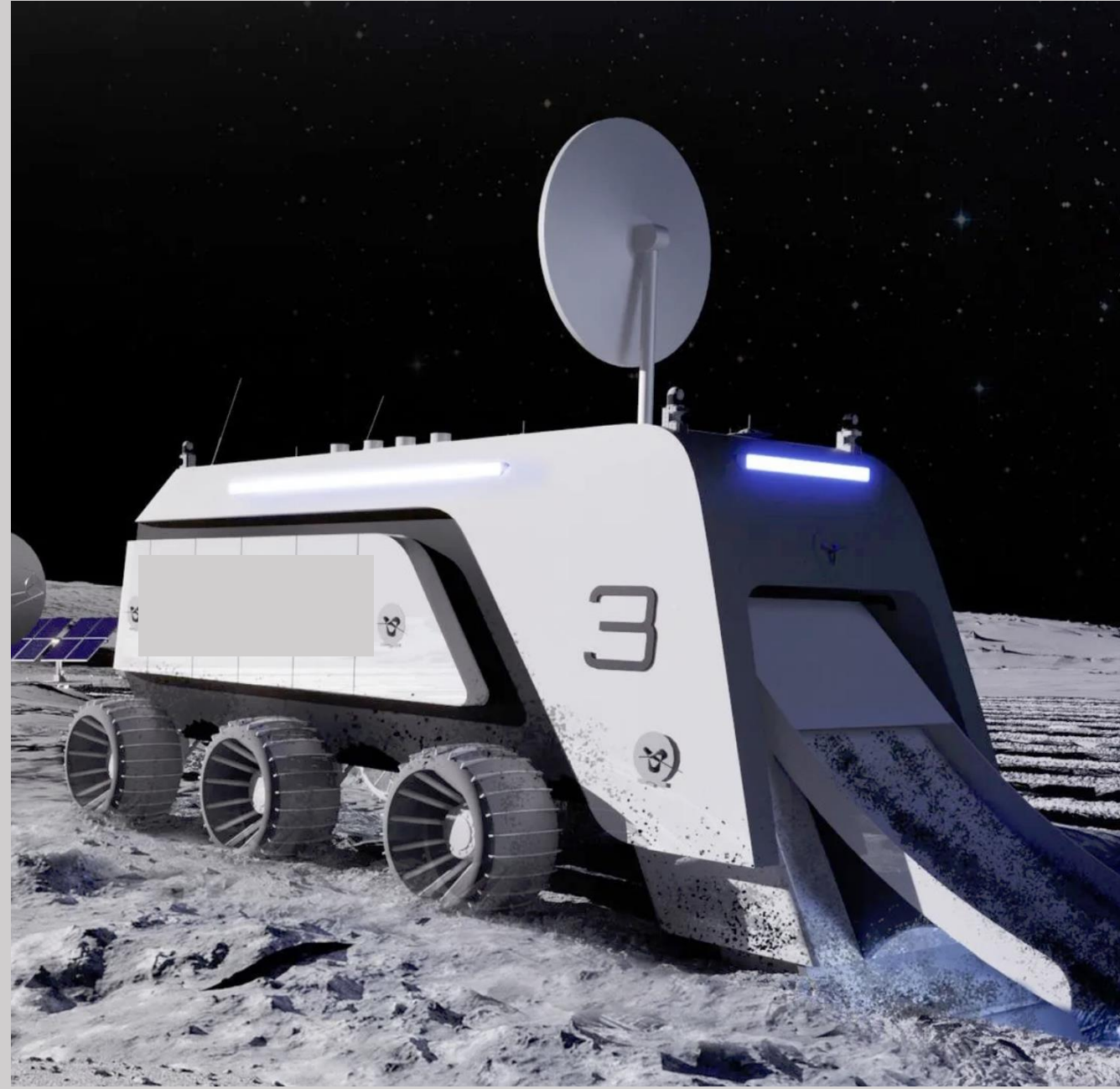
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1 Test Case

The specific test case involves a lunar He-3 mining and processing system.

The mission concept includes initial excavation of regolith followed by heating to release implanted solar wind gases.

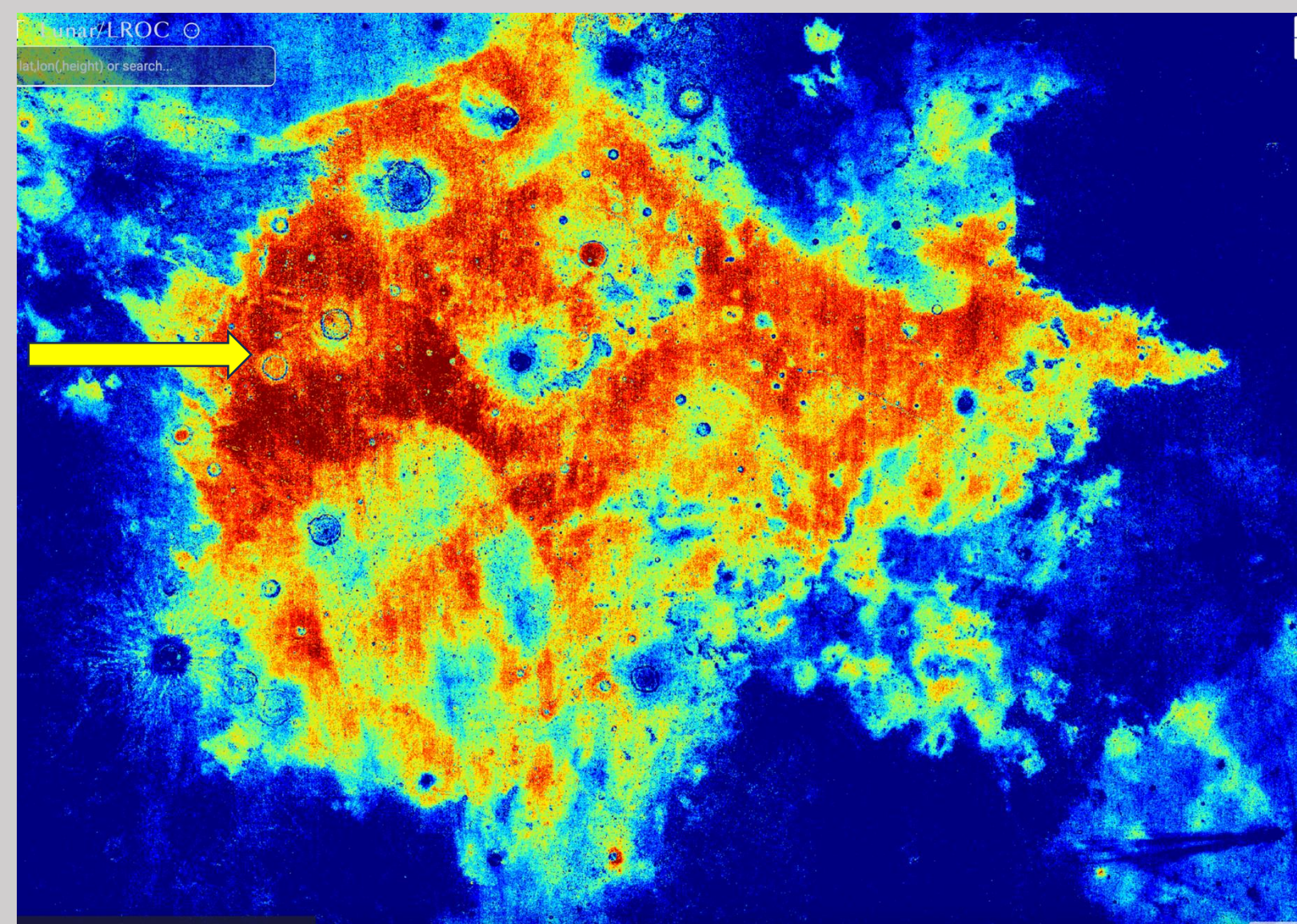


The gases will be cooled to near absolute zero to separate He-3.

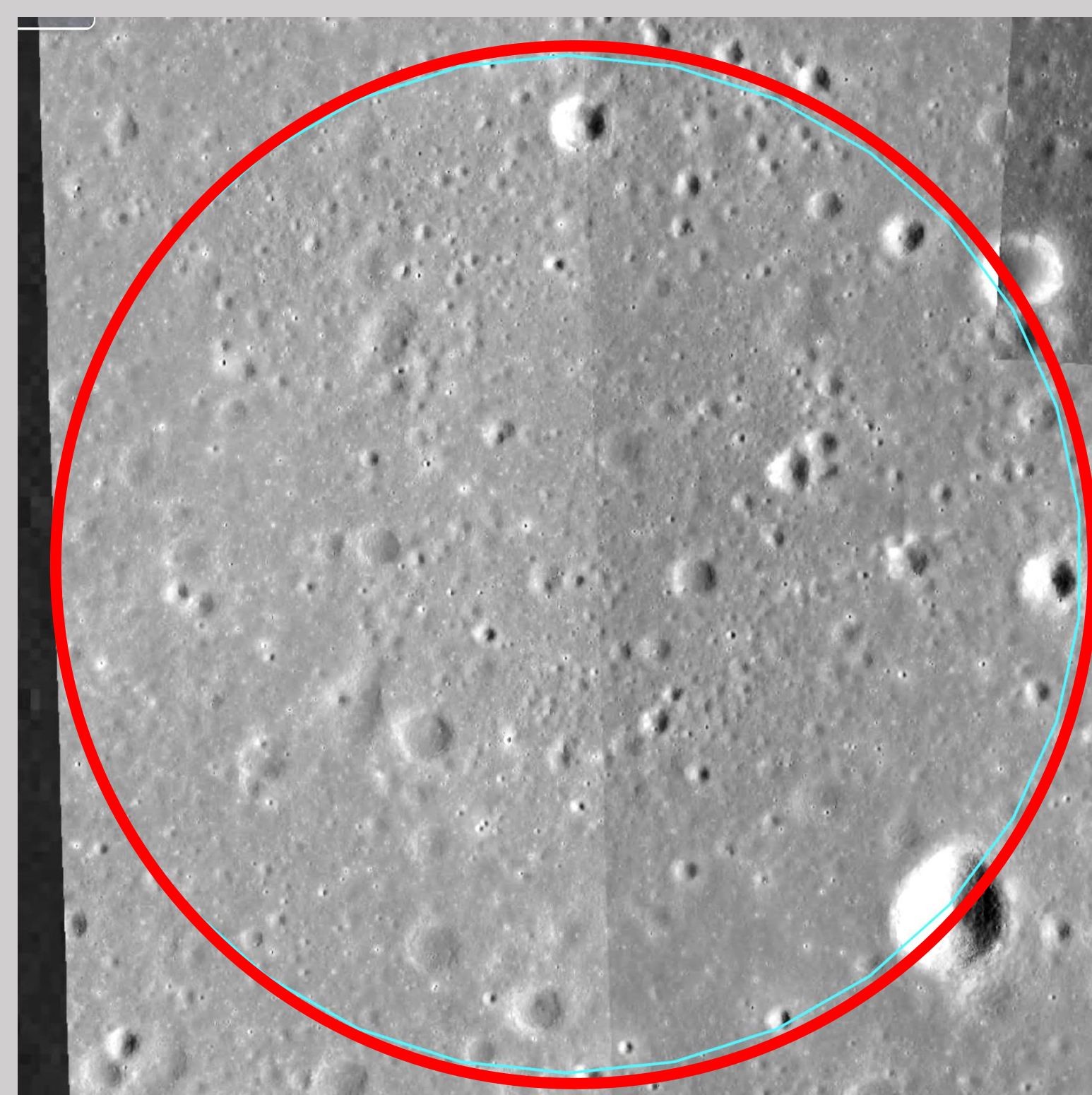
This isotope is then packaged for transport to Earth.

2 ROI

The highest nearside TiO_2 abundances are in Mare Tranquillitatis.



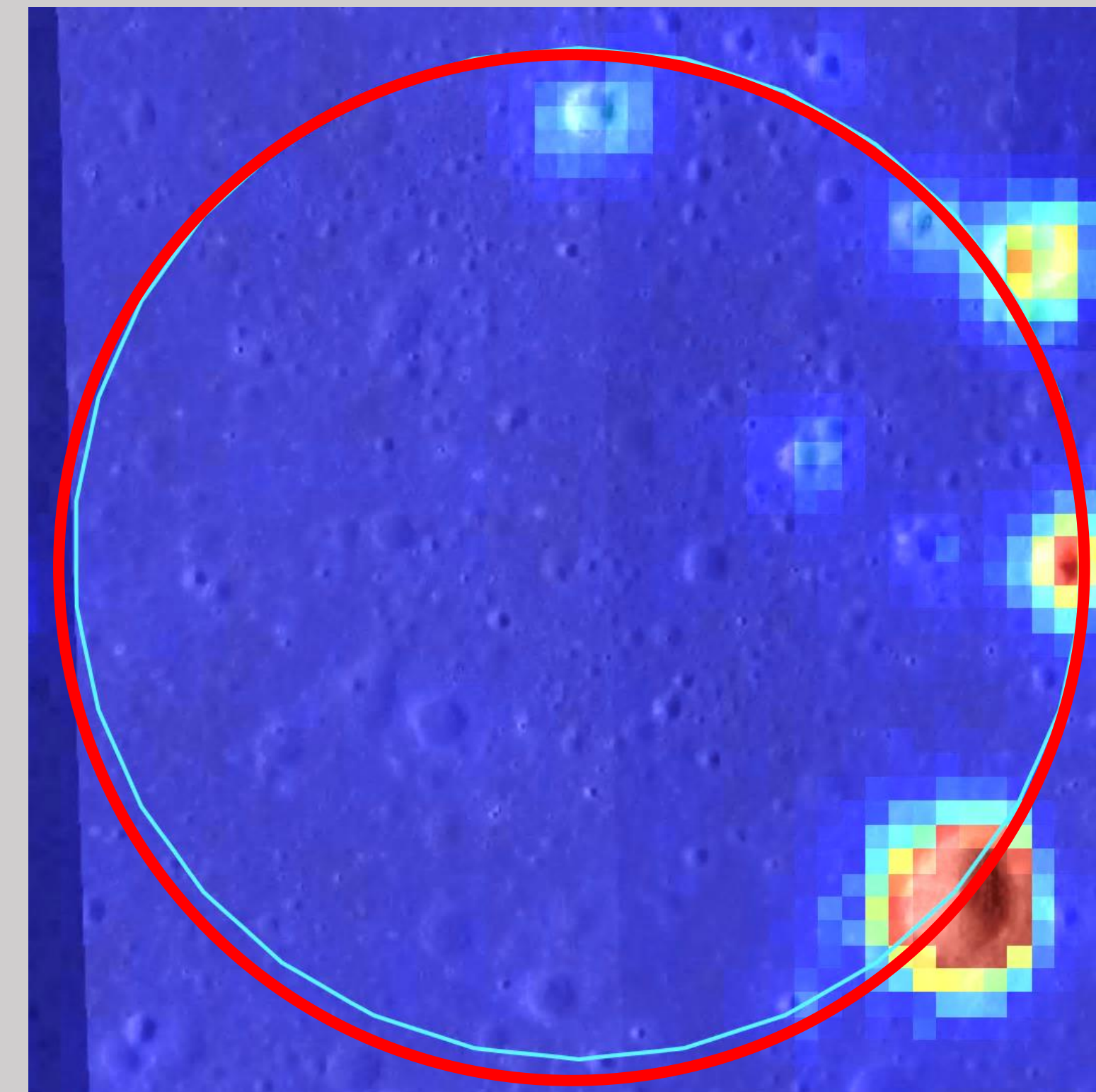
A circular ROI with a diameter of 10 km was defined, centered near 9 N and 20 E.



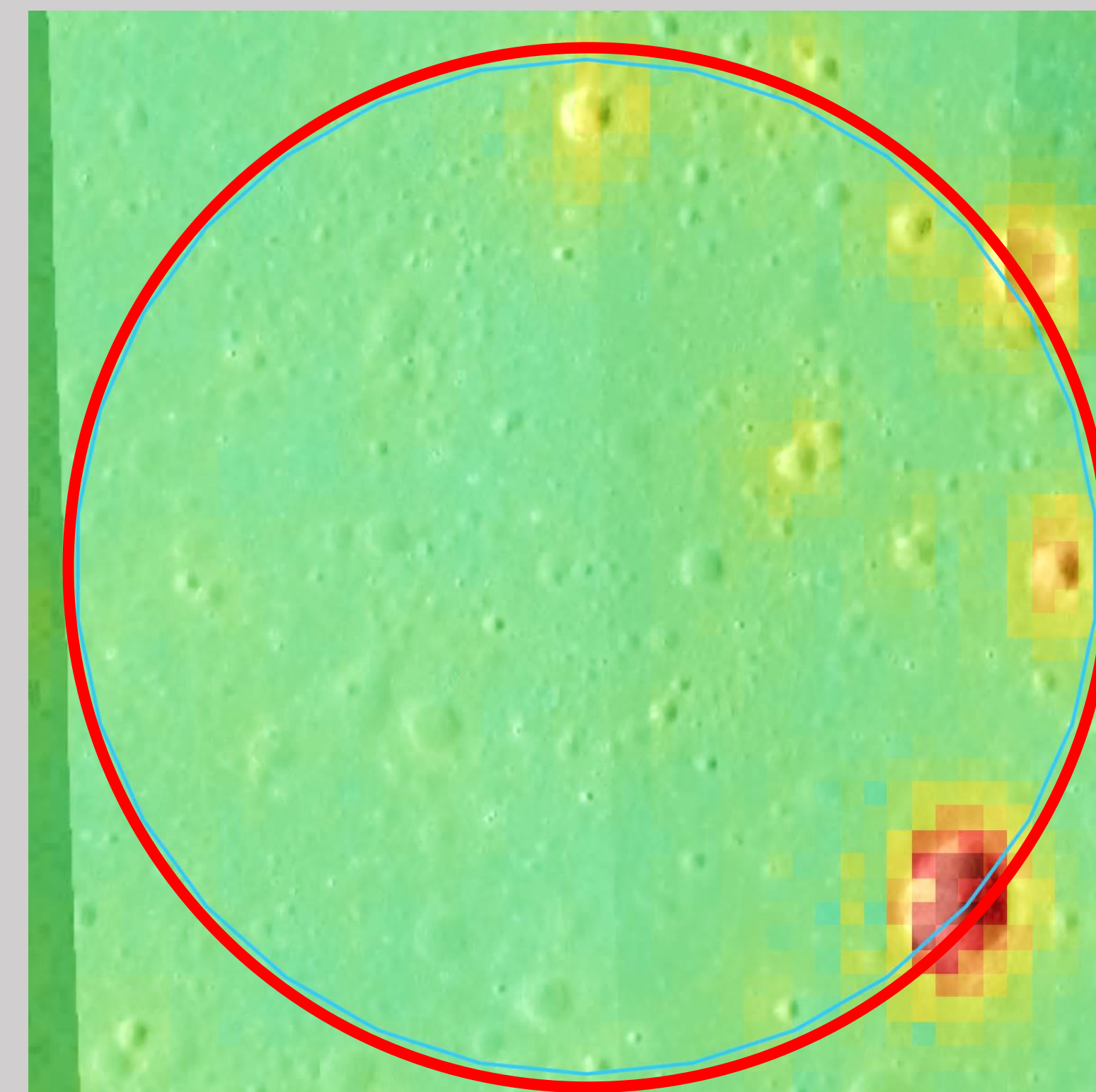
3 Landing Hazards

Minimal hazards to landing and operation:

Mean rock abundance = 0.008

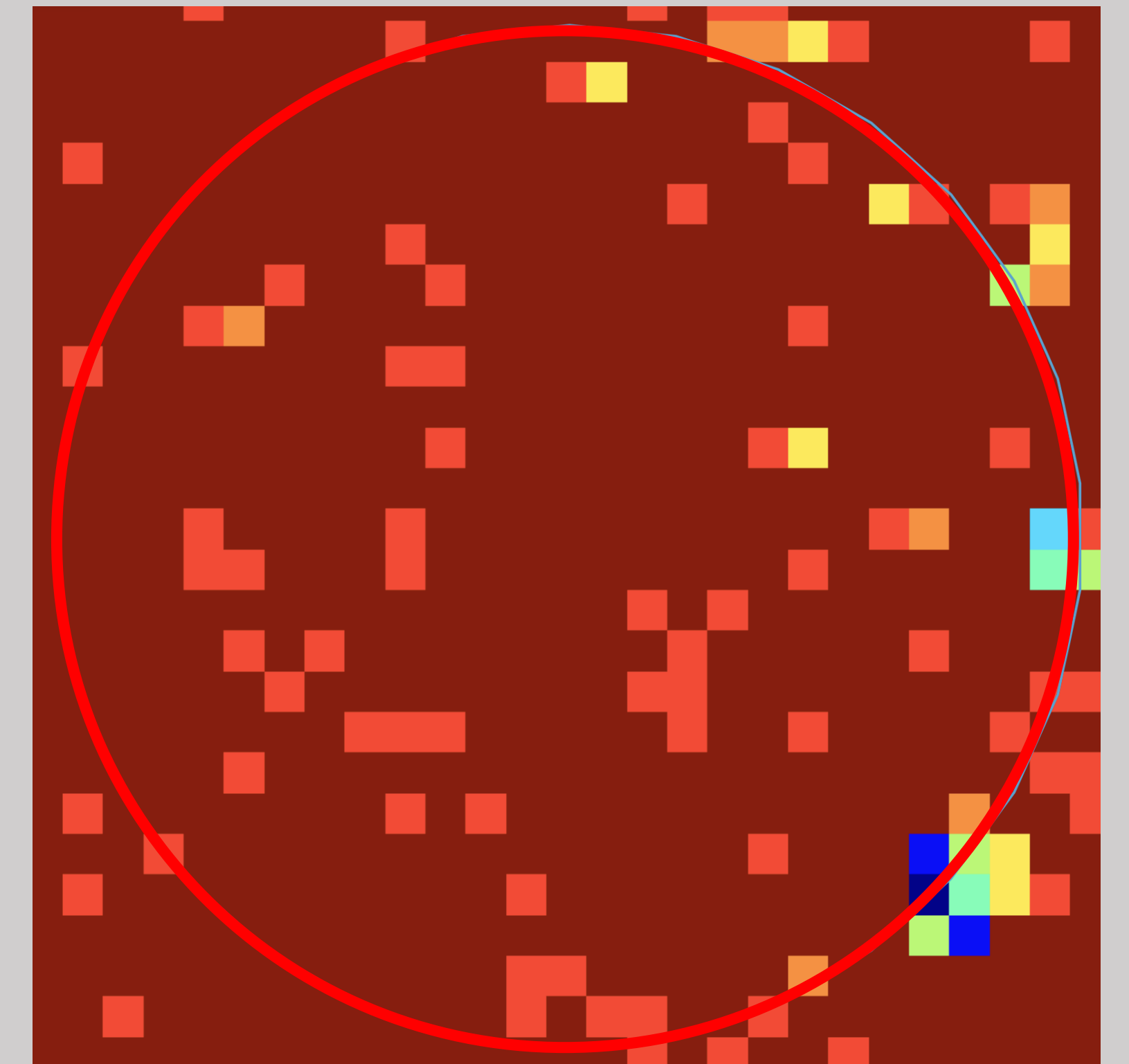


Mean nighttime soil temp = 5.4 K

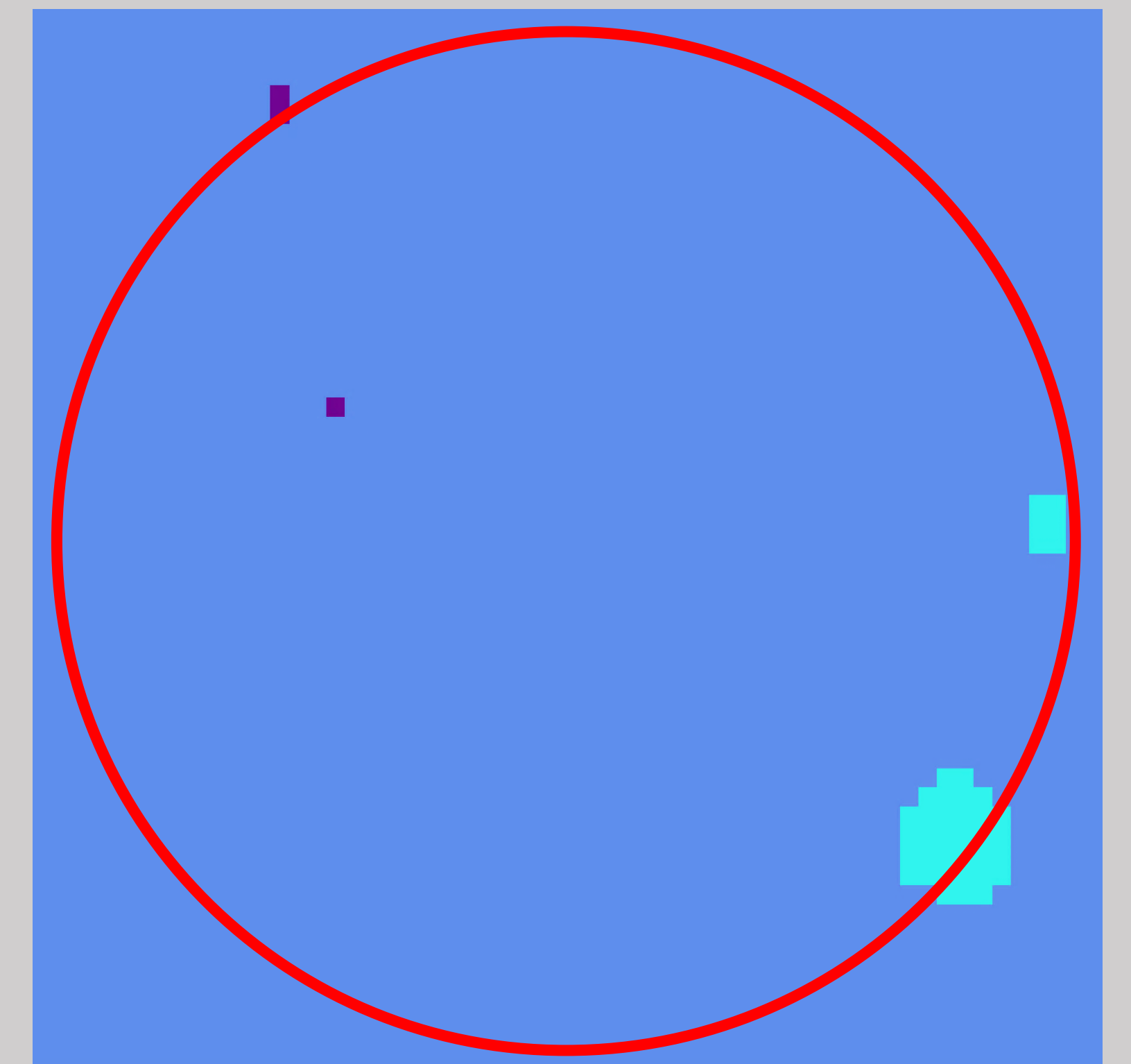


4 He-3 Yield

Mean TiO_2 = 10.4 wt %



Mean OMAT = 0.13 (mature regolith)



He-3 yield = 17 ppb
Excavate entire 10 km ROI to 1 m deep
worth > \$40 billion

