

Radix Polaris

Improved ultrafreezing at lower costs

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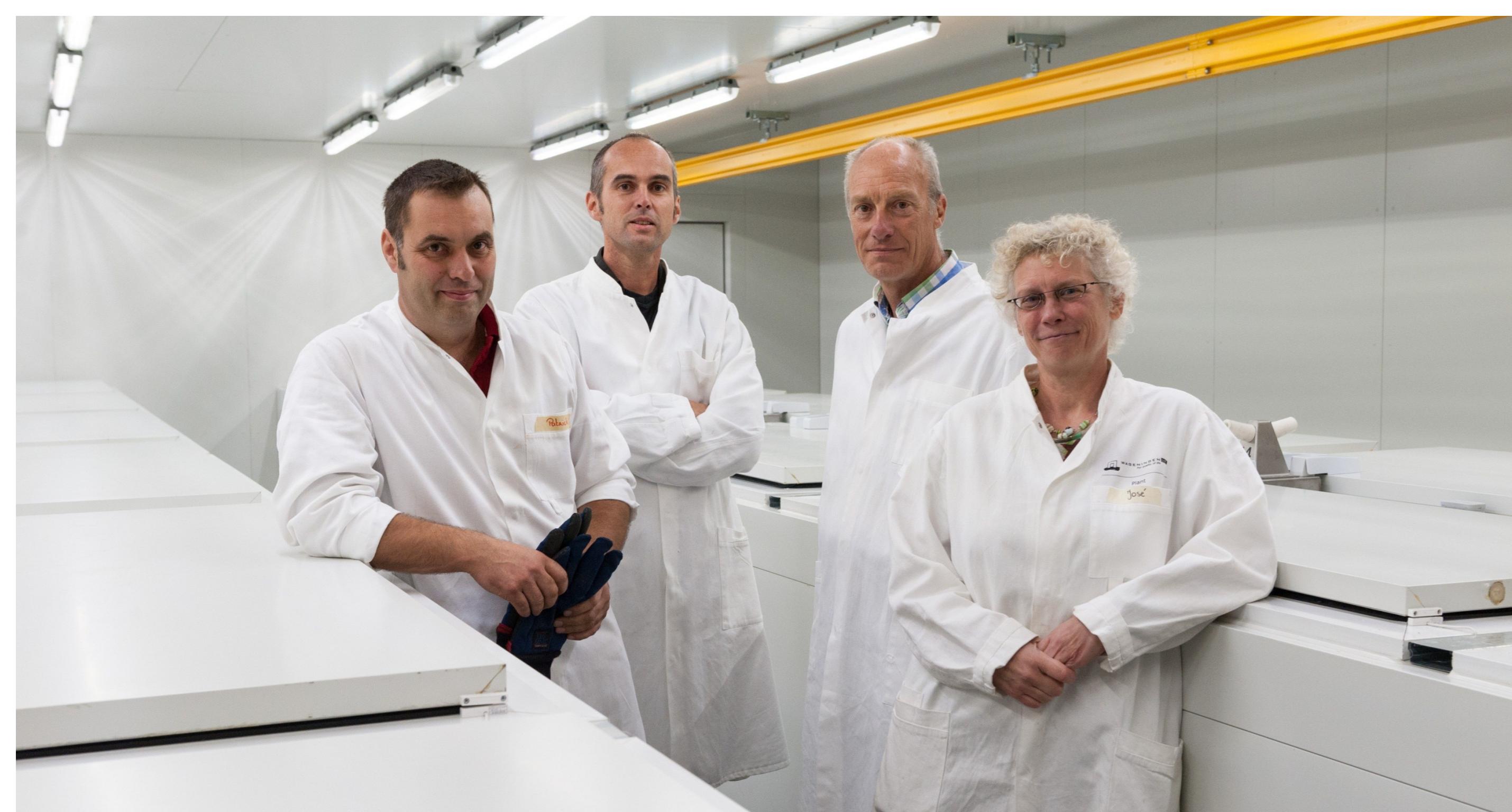


Background to the Polaris Project

Radix Polaris is a -80°C storage system for research samples which allows for significant improvements compared to storage in conventional -80°C freezers. The first storage system of its kind in the world, the concept was developed by Wageningen UR and BERG koudetechniek & klimaatbeheersing B.V. The project was completed in September 2013.

Improvements over conventional ultrafreezers

- Lower energy use
- No risk of damaged samples in case of power cut or malfunction
- Reduced icing of samples
- Lower storage costs for research groups



Picture 1. The Wageningen UR projectteam. Right to left: José van Beckhoven, Sjaak van Brugge, Arjo Meijering (projectmanager), Patrick Hendrickx. Absent on picture: Bert Schipper.



Picture 2. The heart of Polaris: a cascade of energy efficient compressors.



Picture 3. Air humidity is low in Polaris. This means very little ice on racks and samples.



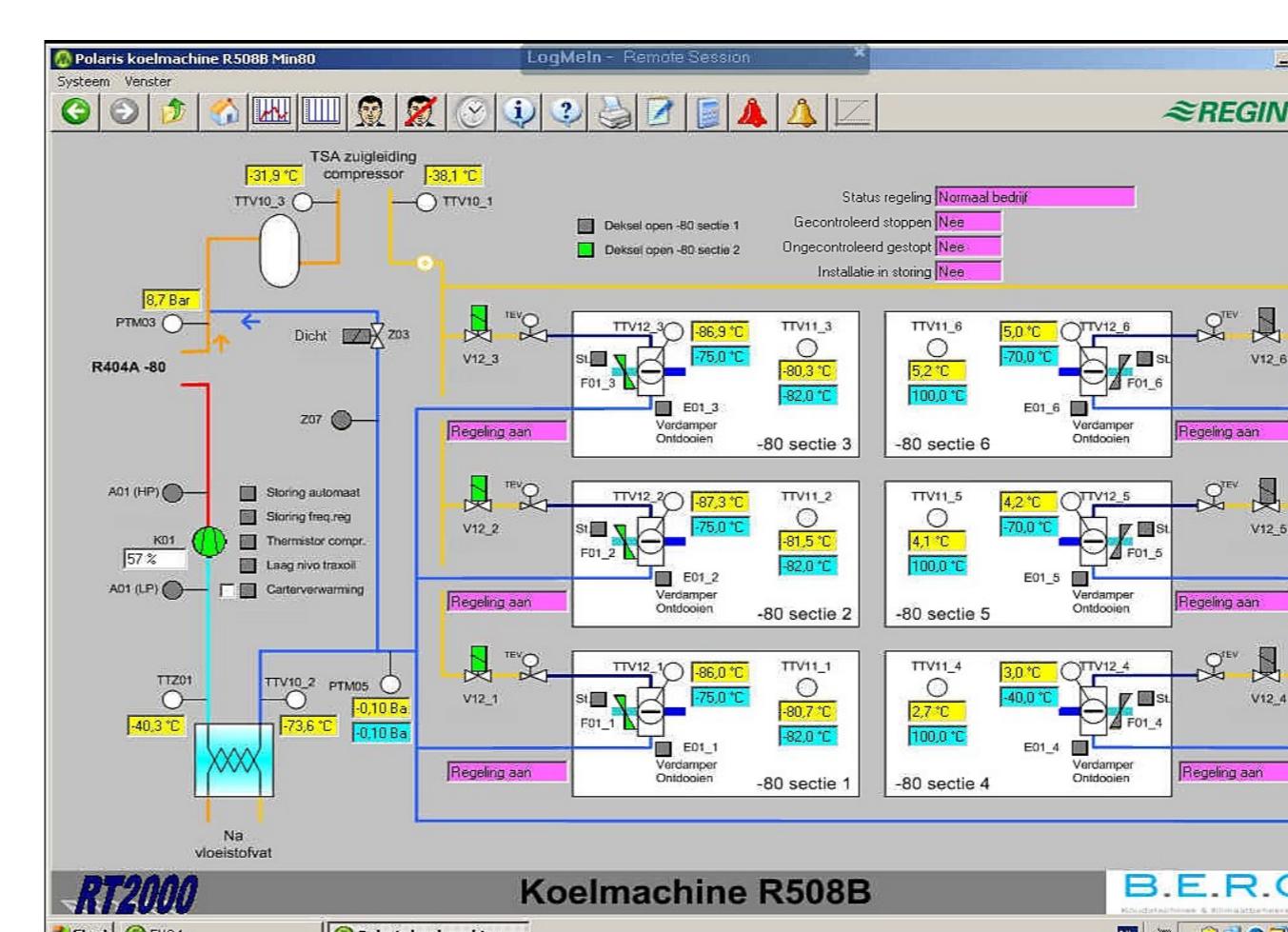
Picture 4. Radix Polaris: two freezing aisles in a cool room. Each aisle consists of twelve sections of one cubic metre each. The resulting 24 m^3 storage space replaces 36 conventional ultrafreezers.

Using 80% less energy than conventional ultrafreezers

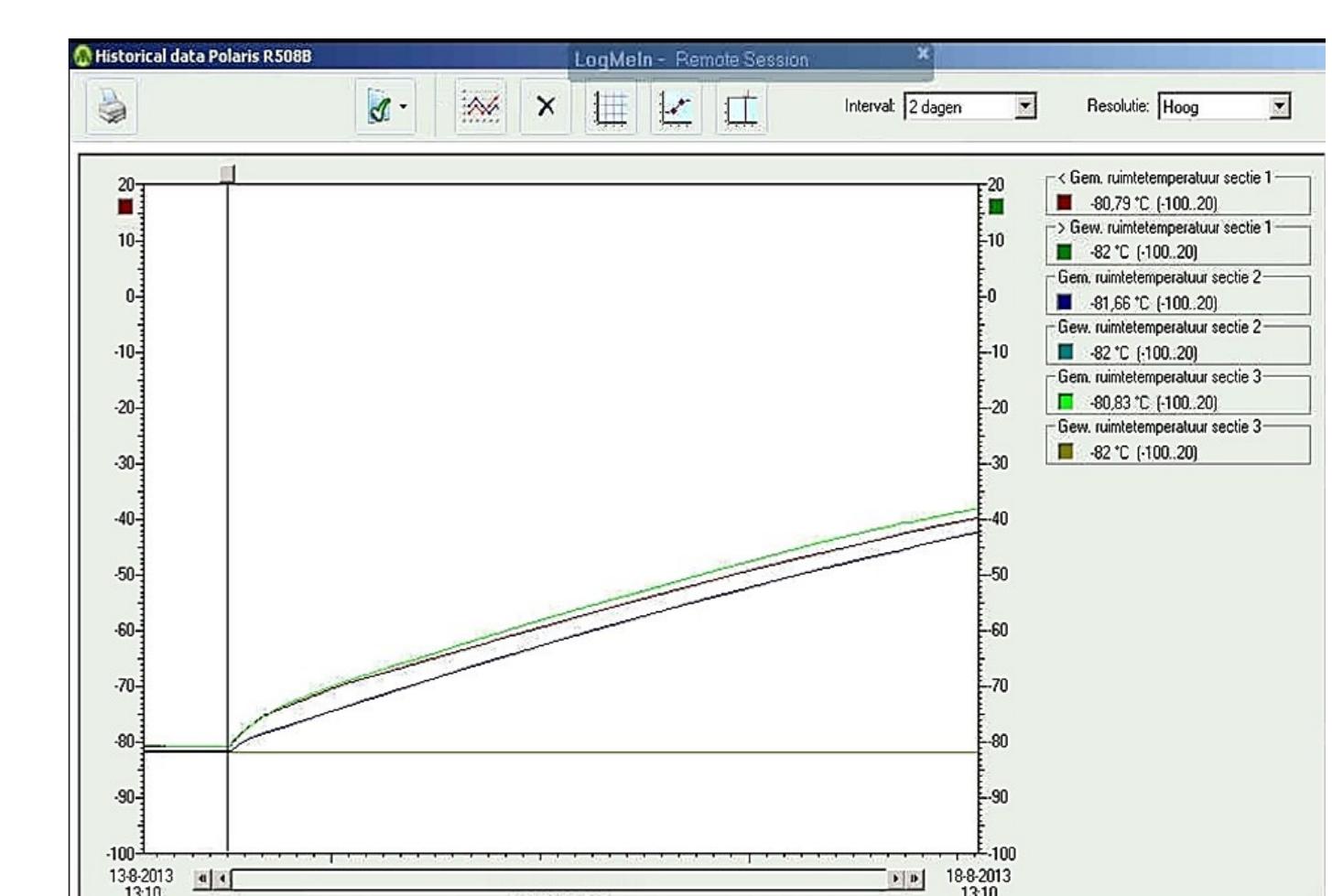
Radix Polaris has highly efficient insulation and a low surface/volume ratio. Extracted heat is drawn outside the room and partly reused for dehumidification. The room does not require additional cooling. Conventional ultrafreezers tend to be relatively poorly insulated. They also blow extracted heat back into the room where they are placed, requiring intensive cooling of freezer rooms in most cases.

Lower investment and exploitation costs

Building Radix Polaris was substantially cheaper than buying 36 ultrafreezers of equal volume. If the retirement of existing freezers is taken into account, the system earns back its costs in less than three years. Exploitation cost for research groups are lowered by 50% by savings on maintenance, energy, replacements and alarm responses.



Picture 5. Internal processes are monitored, so that malfunctions can be tackled early. (exo screenshots taken at compliance tests)



Picture 6. In case of power cut or malfunction warming to the critical -40°C takes five days. So the risk of damaged samples is almost nil.

Acknowledgements

The technical design and realisation of the system were carried out by BERG koudetechniek & klimaatbeheersing B.V.

