



European Thermodynamics Limited

Intelligent Thermal Management



SpaceTEC


Develop, build and test of a 2 stage Thermo-Electric Cooler for Space instruments

25th June 2024

Company Background

 Founded in 2002. Privately owned company

 Bespoke thermal management

 Turnover FY23 £3.9M

 25 staff across 3 sites:

1. Kibworth – R&D, Assembly, Marketing & Sales
2. Lutterworth – Operations and warehousing
3. Nuneaton – Financial and Management



INDUSTRIES



Telecomm



Automotive



TV & Broadcast



Industrial



Lab & Medical



Military

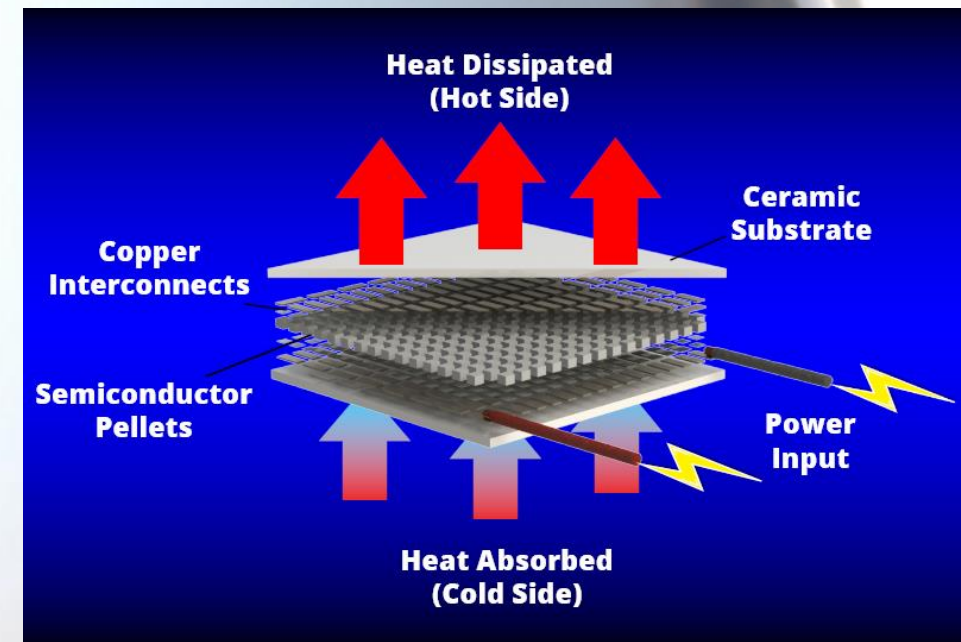


Technology to Pivot

- 🚀 Thermoelectric technology - cooling
- 🚀 Compact, rapid cooling and heating with no moving parts

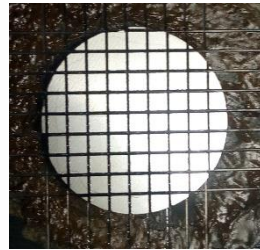
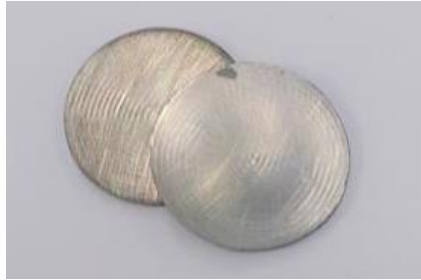
Why space sector?

- 🚀 Space Instruments
- 🚀 European Sourcing Challenging: USA (Dual use restrictions), Russian and Ukrainian manufacturers
- 🚀 ETLs prior R&D:
 - 🚀 Automated production processes for generators
 - 🚀 Novel materials applied to coolers
 - 🚀 Material production process



Company Background: Thermoelectric module production

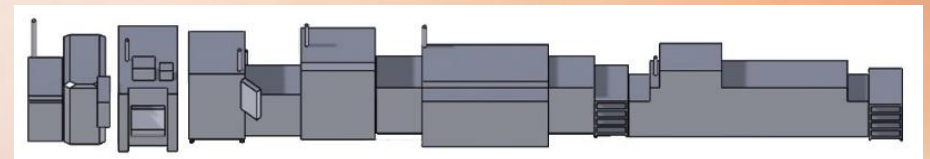
- ✚ In-house low volume production and testing for specialist devices
- ✚ Quality Assurance for outsourced production and failure analysis
- ✚ Pivot technology for cooling in space instruments with 2 stage device



Thermoelectric material

Thermoelectric Pellets

Thermoelectric Device

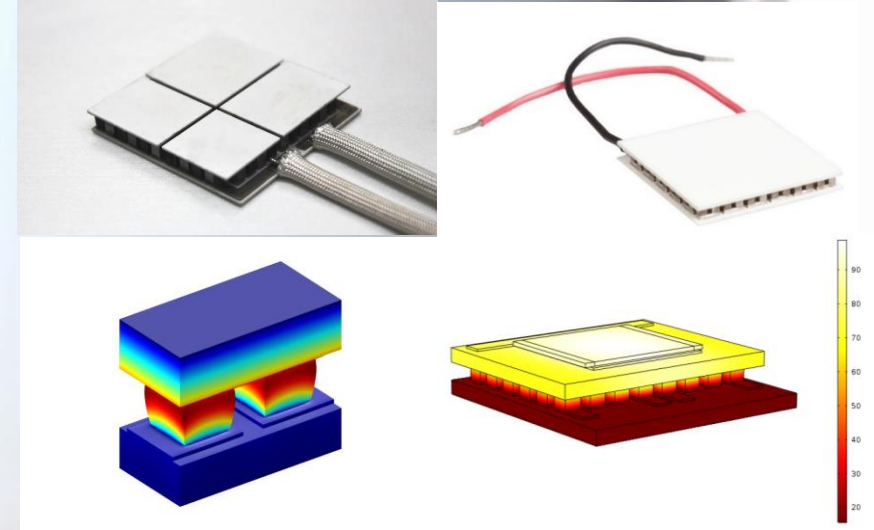


Project Objectives

- Multi-stage TEC for space instruments such as Star Trackers
- Evidence to support commercial engagement with space sector
- Requires following technical objectives:
 - Metallization process
 - Adjust for high DT
 - Manufacture / Test plans suitable for space sector
 - Improve alignment to ensure good yields
 - Create Multi-stage device models

Why Multi-stage?

- Challenging, demonstrates ability for wide DT
- Materials advantage
- Accelerate tech development, extreme specs – scaling into telecoms/optics/LIDAR



A star tracker is a system made up of cameras, electronics and software which enables a satellite or space vehicle to know its orientation. Star Trackers are important for satellites operating in the Earth's orbit or exploring the solar system.



Experience & Future Exploitation



- Pivot into Space Award, promoted to ESA demonstrate commitment
- Quick response/decision making ideal for small business opportunities.
- Engage with ESA for TEC device qualification programmes and commercial contracts.
ESA contract at end of Q1 2024 for Q2 2024 to Q3 2025 – MIUS-TEC single stage.
- Connect with Prime European Star Trackers contractors to seek commercial development and qualification programmes
Established with 3 prime contractors – both technical / commercial.
- Investigating spin-out of TEC device manufacturing:
 - Markets: Space / aerospace / medical / optics-Laser (LIDAR)
 - Capital raise for scale up process, yields and automation.
 - Highly skilled development team – diverse/multi-national
 - Portfolio of IP



Thank you for listening !

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