



Science and
Technology
Facilities Council



THE UNIVERSITY
of EDINBURGH

Remote³: Public Engagement over 1 km underground – and beyond

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Science and Technology Facilities Council

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REHOTE³

Who am I?

Work in UKRI/STFC's Public Engagement (PE) department as a Senior PE Officer

PE Co-ordinator with UKRI/STFC's Boulby Underground Laboratory, part of the Particle Physics Department

Core Team member for Remote³



Agenda

1 Context

2 Remote³ project

Overview, Aims, Development

3 Challenges and Benefits

4 Further Plans



Introduction to STFC and UKRI

The Science and Technology Facilities Council (STFC), part of UK Research and Innovation (UKRI), works with the UK government to deliver, support and invest in fundamental research in astronomy, physics, computational science and space science.



**UK Research
and Innovation**

STFC Public Engagement and Outreach

STFC has a strategic objective to use their stories, community and facilities to engaging the next generation

STFC's facilities give us a unique opportunity to inspire the next generation with their remarkable scale, ambition, and achievement

Wonder Initiative: Science *is* for them!



Daresbury Laboratory
Warrington, Cheshire



UK Astronomy Technology Centre
Edinburgh, Scotland



Boulby Underground Laboratory
Cleveland



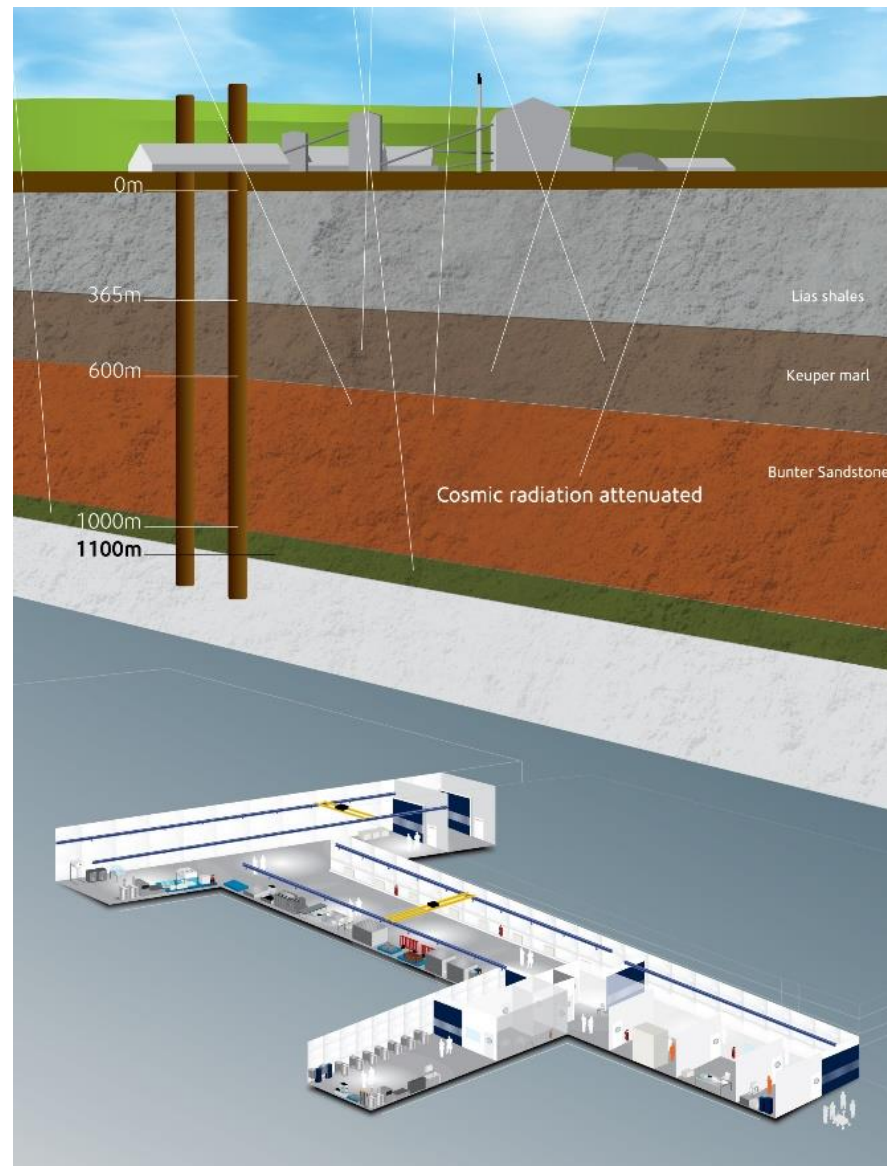
Polaris House
Swindon, Wiltshire



Rutherford Appleton Laboratory
Didcot, Oxfordshire



Chilbolton Observatory
Stockbridge, Hampshire



Boulby Underground Laboratory

- 1.1km underground in a working polyhalite and rock salt mine operated by ICL-UK
- Science at Boulby ranges from low background astro-particle physics to studies of geology/geophysics, climate, the environment, planetary exploration technology development, life in extreme environments on Earth and beyond.
- Remote location is a challenge for taking visitors!

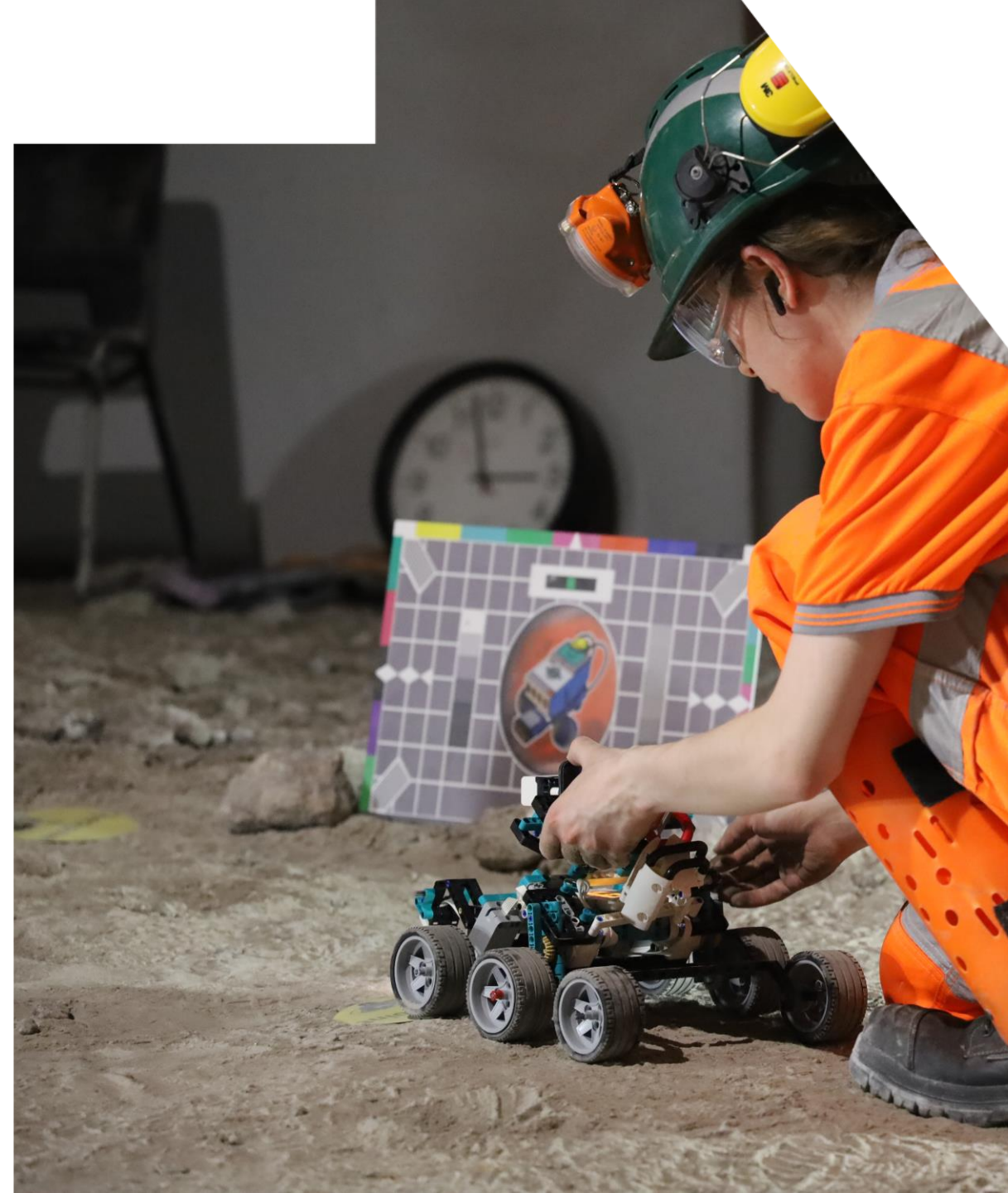
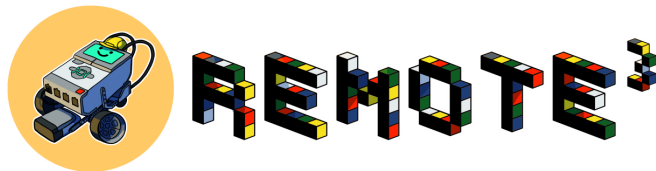


Boulby Underground Laboratory



What is Remote³?

- Teams of school students (primary and secondary) are challenged to design, build and program Lego Mindstorms® robots, working with Scientists, Engineers, and Computer Programmer mentors.
- The completed robots are taken to the Mars Yard at the Boulby Mine, over a kilometre underground and challenged with tasks across a simulated Martian landscape, from navigation and searches to rock collection and return for analysis.



Challenge Map





2019 Pilot



Task 1: Stop at Line

For this task, you should have the robot drive forward until it finds the red line. Then have it spin around on the spot.

HINT: To achieve this, you want the robot to have its motor on until it cannot see the red line and then turn off without delay.

Above is the task map for this activity.

Task 2: Line Counting

For this task, you will need to write a program which has the robot move forward whilst counting any black lines it crosses, until it encounters the red line.

HINT: In order to count lines, your robot will need to know a number to its memory - start like you may remember a secret number!

Above is the task map for this activity.

Task 3: Line Following

For this task, you will need to write a program which has the robot move and follow the black line, until it reaches the red line.

HINT: It may be easier to think of the robot following the left edge of the line. It'll see black, then with it find the edge? What if it sees white?

Above is the task map for this activity.

Remote³ or Remote⁴?

- Initial Teacher workshop and project launch went ahead in Feb 2020 with 10 schools in remote locations of Scotland
- Lockdown began March 2020 and the programme had to be paused
- Challenges taken to online format and shared weekly with the public at home



The image shows a Zoom meeting slide with a dark blue background. In the top left corner, there is the UKRI Science and Technology Facilities Council logo. In the top right corner, there is a small video feed of a woman named Lauren, Rutherford, with a small icon of a robot next to her. The main text on the slide reads: "Welcome to the Remote³ online". Below this, it says "The event will begin shortly" and "Please use the Q&A function to ask questions throughout the talk". At the bottom left, there is a circular icon of a robot and the text "REMOTE³". At the bottom right, there is a small blue triangle with the word "Welcome" next to it. In the top right corner, there is a logo for "BOULBY UNDERGROUND LABORATORY".

Remote³ Aims

We want participants to:

- build skills
- build confidence
- build relationships

- build Lego



Challenges

- Teacher confidence
- Issues with resources (Mindstorms are expensive)
 - Easy to address in the short term but long term is tricky
- Time issue
 - Co-ordinating multiple intervention sessions across schools is a big investment of time and shouldn't be underestimated



Benefits

- Multi-intervention interactions are extremely positive
- Important for aspirations to identify with science and engineering and the people that do it

We want students to:

- build skills
- build confidence
- build relationships

Monday 15th July 2024
Dear Staff of the Remote³ project,

I am writing to thank you and to express my gratitude for the fantastic opportunity you have provided us with and to thank you for all the memories you have given us.

One of my favourite parts of this journey was the trip to RRL because the entire experience provided us with a great opportunity to test our mini rovers. It also provided us with a great atmosphere and expert assistance by the staff and we got to view the facilities in which they work in. Another part of this journey I have loved is the exposure given to using the Lego Mindstorm app and Lego. It has provided some of us with a career path too.

The skills I have received during the tenure of this journey are some I will use in my adult life such as: How to work as a team or how to adapt to the situation. Some skills I may never use, such as: Coding and Building rovers. All in all I have gained alot from this experience.

I hope you provided this funding to another Year 6 class.

Yours Sincerely,

Maistees



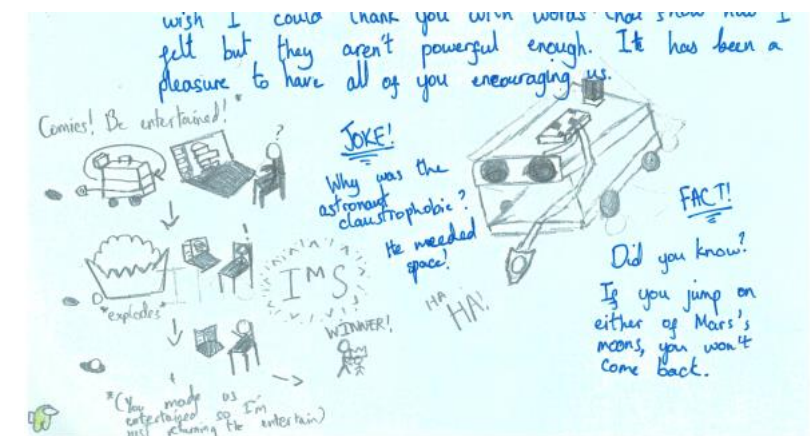
Remote³

Monday 16th July 2024

Dear Sophy and team,
you have done so much for us. you have all helped us know things we didnt know (building our own robots). my most favourite part of Remote³ was making our own logo's, it was incredible and making our own poster's. I love how we went to Rutherford Appleton Laboratory (RAL), I thought it was amazing and brilliant. when you all were down to test our robots I was really surprised that one of our team's mate had guess where it was located, I was a bit shy but I got used to it. I really want to say a very big thank you and I hope I'll see you again.

From

Thank you Team



Benefits

- Build skills
 - “A skill I learnt was how to work together to improve the rover”
 - “My knowledge of coding and design have increased significantly and I am very grateful”
- Build confidence
 - “I was a bit shy but I got used to it”
 - “My parents were really proud of me and my robot”
 - “Don’t give up and keep trying because one day you will make it”
- Build relationships

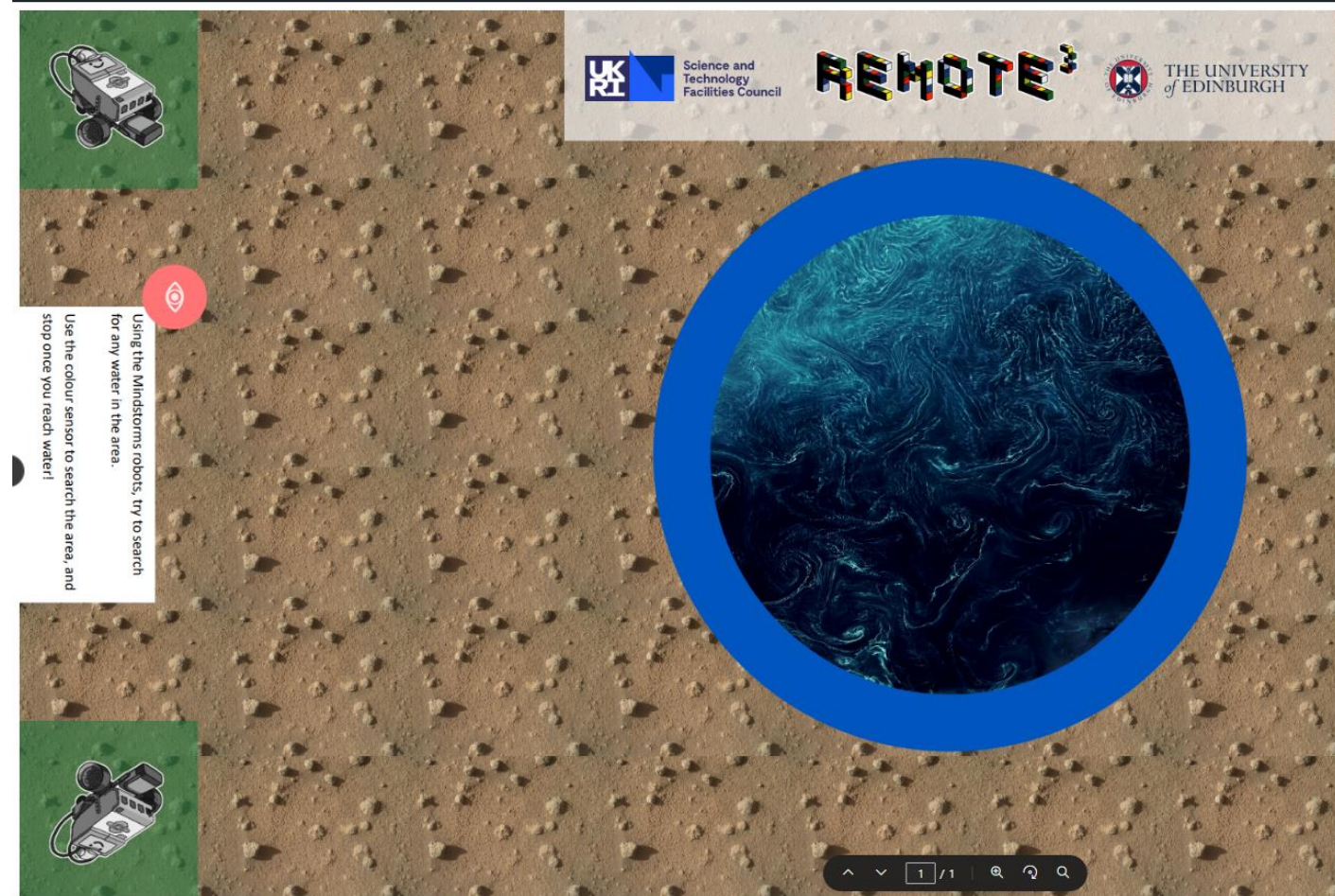
“I loved working with all your colleagues but in my opinion, Will was my favourite but you’re all fantastic”



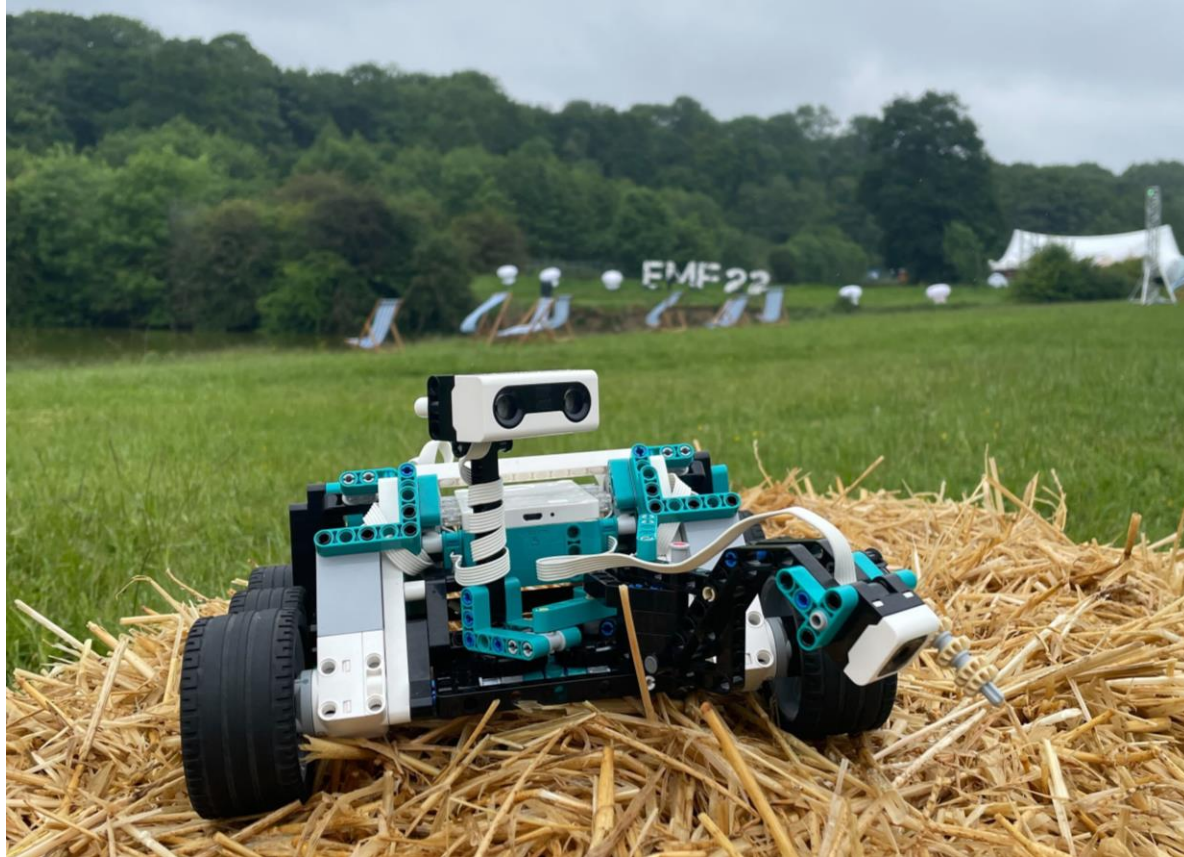
Further plans

The project will continue for another year, with a new cohort of primary and secondary school students across the country with even stronger highlights of curriculum links

Remote³ has previously flourished in a wide variety of different environments and through multiple mediums, which continue to evolve building on lessons learnt each year



Further plans

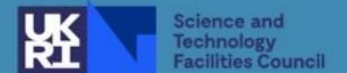


REMOTE³ CHALLENGE BADGE



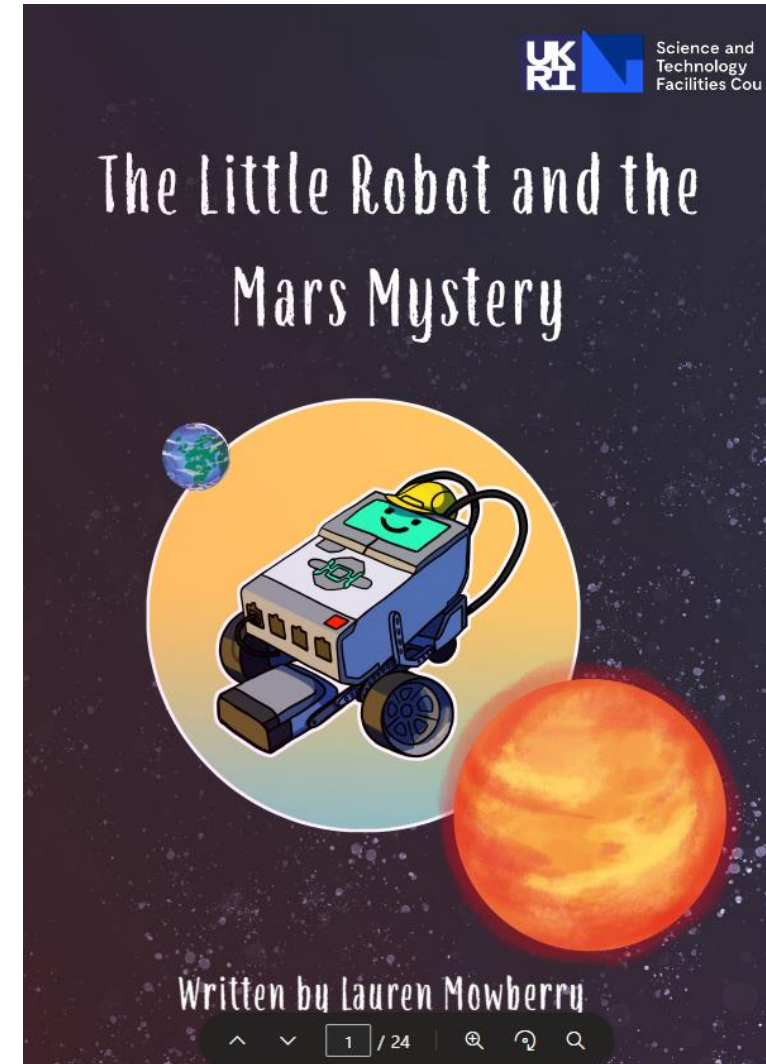
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Boulby Underground
Laboratory

Further plans: the book!





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Questions?



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Thank you



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@STFC_Matters



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