

# Student Robotics

Trustees' Annual Report 2022

From 1st August 2021 to 31st July 2022

## Reference and Administrative Details

|                                     |                                                                                                       |
|-------------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Charity Name:</b>                | Student Robotics                                                                                      |
| <b>Charity Registration Number:</b> | 1163168                                                                                               |
| <b>Principal Address:</b>           | Student Robotics<br>Lytchett House<br>13 Freeland Park<br>Wareham Road<br>Lytchett Matravers<br>Poole |
| <b>Trustees:</b>                    | Diane Dowling<br>David Massey<br>Thomas Scarsbrook                                                    |

## Objectives and Activities

Student Robotics' purpose, as specified in its constitution, is the advancement of education and training for the public benefit, particularly in relation to engineering, mathematics, robotics, computer skills, computer science, computer software development and related subjects.

The primary activity carried out by the charity to meet its objective is organising and running an annual robotics competition for 16 to 19 year-olds. This competition challenges teams of students to design, build and develop autonomous robots. After announcing the year's game, we give teams six months to engineer their creations. We supply each team with a core, bespoke electronics kit and mentor teams throughout. We do not charge a fee to take part in the competition as we believe that this poses an unreasonable barrier to entry, especially to those who may initially have minimal exposure to engineering and robotics and therefore may not begin with a high level of confidence. There is little exposure to real world engineering in formal education settings for this age group so it is important that there are no barriers to "having a go".

The charity continues to be successful in meeting its aim of providing young people with an introduction to STEM careers. Our vision states that “We want to foster a world where engineering and artificial intelligence is accessible to young people.” The fact that our volunteers are almost entirely drawn from those who have taken part in Student Robotics’ events in previous competition cycles, and that we continue to recruit new schools, demonstrates that we are fostering a lively interest in engineering amongst the students who take part in our competition. Our mission is “To bring the excitement of engineering and the challenge of coding to young people through robotics.” and it is clear that we continue to achieve this.

## Achievements and Performance

After two years of virtual competitions due to COVID-19, we were delighted that this year we were able to return to an in-person event for our main competition and were able to re-introduce the physical engineering challenge which our competitors and team leaders tell us is so important. The number of teams accepted into the competition was limited by the functioning number of our bespoke robotics kits we could provide. There was some drop out in the number of teams who were able to attend the final event and a total of 26 teams competed over the final competition weekend.

The Kickstart event where the game was announced was held virtually and live-streamed on YouTube through the Student Robotics channel. Competitors were able to post questions directly to the chat alongside the video and these were answered in real time. As well as announcing the details of the game, teams were given information about the structure of the competition and alerted to key problems that they would need to solve. We also released a small series of “Microgames” to allow teams to get familiar with our robotics kits.

Building on the success of the previous year, we created a moderated Discord server for use throughout the competition cycle. Team Leaders and competitors were invited to sign up so they could ask for help, share progress and chat to other participants throughout the year. We observed an increased presence of teams on the server with far more inter-team communication and a higher level of peer support. It was satisfying to be able to foster a sense of community and this is something we will continue to build on in future competition cycles.

Our game this year, This Way Up, challenged teams to collect tin cans from the arena and ensure that they were up the right way for maximum points. When in a team’s scoring zone, correctly oriented cans were worth 3 points, upside down cans were worth one point, and cans lying on their side were worth nothing. However, not all cans were created equal: Tin cans on the arena floor started upside down, but those on the raised platform in the centre were already the right way up, making them harder to get but easier to score points with. Our teams could detect a can’s orientation with an insulating band along the bottom. Teams were scored at the end of the match for collecting the most points.

For the first time we ran some of our Tech Day events virtually. These events are opportunities for our teams to spend a dedicated day hacking on their robots with help from our volunteers. While historically we’ve only run these events in person, due to the distributed nature of our volunteers and the residual covid risk we opted to run these in our

Discord support server. Teams would join voice channels where they could get support from our volunteers and interact with other teams to share ideas.

Our main event of the year was our competition event, which was held at the University of Southampton's Students' Union building. The two-day event was held over the weekend of the 23rd and 24th of April. We had 44 volunteers help us over the course of the event with roughly 250 competitors in attendance. With league matches throughout Saturday and on Sunday morning and a Knockout round on the Sunday afternoon.

We live-streamed the competition to YouTube, using what we learned from the previous virtual competitions to improve our production values for remote spectators. We had voiceovers from arena-side commentators during the matches, and from different volunteers between matches to review the match and provide some filler material.

We rewrote the software stack of our robotics kits to use the latest version of the Python programming language. This helps our competitors as they will be using modern technology that is used in businesses and they may already be learning in college.

We secured the support of the Institution of Engineering and Technology and the Institution of Mechanical Engineers through their Engineering Education Grant Scheme to allow us to update the robotics kits we provide our teams. Plans are in progress to transition to using Raspberry Pi single board computers instead of our current ODroids to provide our teams with the latest in technology.

## Structure, Governance and Management

Student Robotics is a Charitable Incorporated Organisation (CIO), registered on 18th August 2015. The charity is governed by its constitution which defines its objectives, powers and structure of governance.

Student Robotics is led by a board of trustees that communicate on a regular basis to discuss the direction and policy of the charity. The trustees also meet on a semi-regular basis to fulfil the requirements set out in the constitution.

The board of trustees is made up of engineering and computer science professionals and educators. The specialised knowledge held by the trustees in these subjects is an advantage when meeting the charity's aims and objectives since it ensures the technological content of its activities is both state of the art and relevant to its beneficiaries. Having two trustees who had managed student teams gives a clear insight into how the teams perceive the competition and the benefits they take from it.

Trustees have been recruited based upon their involvement with activities run prior to the registration of the charity and through word of mouth since becoming a charity. It is envisaged that future trustees may be recruited from past beneficiaries of the charity as they enter into the professional world. New trustees are appointed either by a resolution of the members of the charity or by a decision of the existing trustees.

As trustees have had prior intimate involvement with the charity's activities and are actively

involved with the day-to-day running of the activities they are already well versed in the running and operation of the charity. To aid with this, the charity has a general approach of openness and transparency with regards to its governance and management, where appropriate.

All trustees are actively encouraged to contribute to and improve the charity's 'Operations Manual'. This manual sets out the operational structure of the charity; the delegation of powers to others in named roles, for the purpose of the day-to-day running of each aspect of the charity; and the processes to be followed by people in named roles. This manual is treated as a living document and is constantly evolving to meet the requirements of the charity.

The structure of the charity is organised with the aim of potentially offering other activities, in addition to the annual robotics competition for 16-19 year olds, at some point in the future. The responsibilities of the day to day running of the charity are delegated to Committees each with a specific focus and overseen by the trustees.

The responsibility of running the charity's primary activity, the annual robotics competition for 16-19 year olds, is delegated to the Competition Committee, a committed group of volunteers who report regularly to the trustees.

The robotics kit is maintained by a team led by the Kit Team Committee who have responsibility for developing and maintaining the kit that is used in the competition. The Kit Team comprises engineers and engineering students who bring a wide range of expertise to the task.

The charity's technical infrastructure and services are managed by the Infrastructure Team Committee who are responsible for ensuring the charity has the technical infrastructure it needs to function. The Infrastructure Team comprises software and DevOps engineers with a wealth of experience and knowledge in the area.

The trustees are responsible for heading up the Fundraising Team, which is responsible for ensuring the charity has sufficient funds to run its programme by reaching out to and working with existing and potential sponsors.

The public image of Student Robotics is the responsibility of the Marketing Team Committee who manage the charity's social media presence as well as its website. The Committee is also responsible for recruiting new competitor teams through these channels.

## Financial Review

At the end of the financial year the charity had £9,796 in the bank account and no creditors. Reserves are necessary to allow the next competition to be planned and launched without relying on having to attract funding to a specific schedule.

Our fundraising team had a degree of success in attracting new sources of sponsorship and our marketing team has done an excellent job in revamping the web site so that there is

more information about the charity for potential sponsors. They have worked hard to ensure that our social media accounts have been actively used to promote our work throughout the year.

A financial statement has been filed alongside this report and the full accounts are available for inspection at any time.

Approved by the board of Trustees and signed on its behalf:

*Diane Dowling*

Diane Dowling  
Trustee (Treasurer)



CHARITY COMMISSION  
FOR ENGLAND AND WALES

Student Robotics

No (if any)  
1163168

CC16a

## Receipts and payments accounts

|                        |                                 |    |                               |
|------------------------|---------------------------------|----|-------------------------------|
| For the period<br>from | Period start date<br>01/08/2021 | To | Period end date<br>31/07/2022 |
|------------------------|---------------------------------|----|-------------------------------|

### Section A Receipts and payments

|                                                       | Unrestricted<br>funds<br>to the nearest £ | Restricted<br>funds<br>to the nearest £ | Endowment<br>funds<br>to the nearest £ | Total funds<br>to the nearest £ | Last year<br>to the nearest £ |
|-------------------------------------------------------|-------------------------------------------|-----------------------------------------|----------------------------------------|---------------------------------|-------------------------------|
| <b>A1 Receipts</b>                                    |                                           |                                         |                                        |                                 |                               |
| Donations                                             | 12,585                                    | -                                       | -                                      | 12,585                          | 1,378                         |
|                                                       | -                                         | -                                       | -                                      | -                               | -                             |
|                                                       | -                                         | -                                       | -                                      | -                               | -                             |
|                                                       | -                                         | -                                       | -                                      | -                               | -                             |
|                                                       | -                                         | -                                       | -                                      | -                               | -                             |
|                                                       | -                                         | -                                       | -                                      | -                               | -                             |
|                                                       | -                                         | -                                       | -                                      | -                               | -                             |
| <b>Sub total (Gross income for AR)</b>                | 12,585                                    | -                                       | -                                      | 12,585                          | 1,378                         |
| <b>A2 Asset and investment sales, (see table).</b>    |                                           |                                         |                                        |                                 |                               |
|                                                       | -                                         | -                                       | -                                      | -                               | -                             |
|                                                       | -                                         | -                                       | -                                      | -                               | -                             |
| <b>Sub total</b>                                      | -                                         | -                                       | -                                      | -                               | -                             |
| <b>Total receipts</b>                                 | 12,585                                    | -                                       | -                                      | 12,585                          | 1,378                         |
| <b>A3 Payments</b>                                    |                                           |                                         |                                        |                                 |                               |
| Accounting and legal                                  | 40                                        | -                                       | -                                      | 40                              | -                             |
| Bank Fees                                             | 42                                        | -                                       | -                                      | 42                              | 33                            |
| Costs of competition                                  | 930                                       | -                                       | -                                      | 930                             | 1,248                         |
| Container rental                                      | 1,373                                     | -                                       | -                                      | 1,373                           | 1,373                         |
| Digital Infrastructure                                | 346                                       | -                                       | -                                      | 346                             | 338                           |
| Insurance                                             | 451                                       | -                                       | -                                      | 451                             | 430                           |
| Kit development                                       | 2,732                                     | -                                       | -                                      | 2,732                           | -                             |
| Mail services                                         | 519                                       | -                                       | -                                      | 519                             | 300                           |
| Marketing                                             | 483                                       | -                                       | -                                      | 483                             | -                             |
| <b>Sub total</b>                                      | 6,916                                     | -                                       | -                                      | 6,916                           | 1,226                         |
| <b>A4 Asset and investment purchases, (see table)</b> |                                           |                                         |                                        |                                 |                               |
| Loan repayment                                        | -                                         | -                                       | -                                      | -                               | 8,882                         |
|                                                       | -                                         | -                                       | -                                      | -                               | -                             |
| <b>Sub total</b>                                      | -                                         | -                                       | -                                      | -                               | 8,882                         |
| <b>Total payments</b>                                 | 6,916                                     | -                                       | -                                      | 6,916                           | 10,108                        |
| <b>Net of receipts/(payments)</b>                     | 5,669                                     | -                                       | -                                      | 5,669                           | 8,730                         |
| <b>A5 Transfers between funds</b>                     | -                                         | -                                       | -                                      | -                               | -                             |
| <b>A6 Cash funds last year end</b>                    | 4,127                                     | -                                       | -                                      | 4,127                           | 12,857                        |
| <b>Cash funds this year end</b>                       | 9,796                                     | -                                       | -                                      | 9,796                           | 4,127                         |

## Section B Statement of assets and liabilities at the end of the period

| Categories                                                  | Details                                                | Unrestricted funds<br>to nearest £ | Restricted funds<br>to nearest £ | Endowment funds<br>to nearest £ |
|-------------------------------------------------------------|--------------------------------------------------------|------------------------------------|----------------------------------|---------------------------------|
| <b>B1 Cash funds</b>                                        | HSBC                                                   | 9,796                              | -                                | -                               |
|                                                             |                                                        | -                                  | -                                | -                               |
|                                                             |                                                        | -                                  | -                                | -                               |
|                                                             | <b>Total cash funds</b>                                | <b>9,796</b>                       | -                                | -                               |
|                                                             | (agree balances with receipts and payments account(s)) | OK                                 | OK                               | OK                              |
| <b>B2 Other monetary assets</b>                             | Details                                                | Unrestricted funds<br>to nearest £ | Restricted funds<br>to nearest £ | Endowment funds<br>to nearest £ |
|                                                             |                                                        | -                                  | -                                | -                               |
|                                                             |                                                        | -                                  | -                                | -                               |
|                                                             |                                                        | -                                  | -                                | -                               |
|                                                             |                                                        | -                                  | -                                | -                               |
|                                                             |                                                        | -                                  | -                                | -                               |
|                                                             |                                                        | -                                  | -                                | -                               |
| <b>B3 Investment assets</b>                                 | Details                                                | Fund to which asset belongs        | Cost (optional)                  | Current value (optional)        |
|                                                             |                                                        |                                    | -                                | -                               |
|                                                             |                                                        |                                    | -                                | -                               |
|                                                             |                                                        |                                    | -                                | -                               |
|                                                             |                                                        |                                    | -                                | -                               |
| <b>B4 Assets retained for the charity's own use</b>         | Details                                                | Fund to which asset belongs        | Cost (optional)                  | Current value (optional)        |
|                                                             |                                                        |                                    | -                                | -                               |
|                                                             |                                                        |                                    | -                                | -                               |
|                                                             |                                                        |                                    | -                                | -                               |
|                                                             |                                                        |                                    | -                                | -                               |
|                                                             |                                                        |                                    | -                                | -                               |
|                                                             |                                                        |                                    | -                                | -                               |
|                                                             |                                                        |                                    | -                                | -                               |
|                                                             |                                                        |                                    | -                                | -                               |
| <b>B5 Liabilities</b>                                       | Details                                                | Fund to which liability relates    | Amount due (optional)            | When due (optional)             |
|                                                             |                                                        |                                    |                                  |                                 |
|                                                             |                                                        |                                    | -                                |                                 |
|                                                             |                                                        |                                    | -                                |                                 |
|                                                             |                                                        |                                    | -                                |                                 |
| Signed by one or two trustees on behalf of all the trustees |                                                        | Signature                          | Print Name                       | Date of approval                |
|                                                             |                                                        | <i>Diane Dowling</i>               | Diane Dowling                    | 09/05/2023                      |
|                                                             |                                                        |                                    |                                  |                                 |