

# MANSEDS

MANCHESTER STUDENTS FOR THE EXPLORATION AND DEVELOPMENT OF SPACE

## NEWSLETTER

October 2018

This Newsletter is to provide updates and information to our support staff, sponsors and students on all of the projects and activities of ManSEDS this month.

### Back to University

To all who dare to explore the unknown:

Have you ever looked up to a very starry clear night and just thought “wow”? It is impossible not to fall in love with the night sky, once in love with it, forever lost in its infinite darkness and mystery where heartbeats are skipped. We are motivated to know what hides beyond those dim lights.

We are a group of passionate students participating in national and international competitions, organising workshops for students like you, doing various forms of outreach and still finding time for occasional socials. ManSEDS stands for Manchester Student for the Exploration and Development of Space.

Space represents the biggest challenge possible for the human mind. You may ask, why space? Because it is there, it is there for everyone to be inspired and to unearth its secrets. Because it pushes us to give the best of our human capabilities; to fulfil two of our most primitive needs, survival, and curiosity.

Human nature spans a vast spectrum of personalities and traits, but one thing is certain for every one of us. We make the impossible happen and create the unimaginable. We would like you to join us to take the very first baby steps for humankind’s biggest leap yet. Let’s explore, colonize and discover space.

What’s next? Explore your passion.

For more information on our projects follow us on Facebook at:

<https://www.facebook.com/MANSEDS/>



ManSEDS Committee

## A word from ManSEDS president

We had a short conversation with our president, meet Zuzanna Nagadowska.



### **Zuzanna, what drives you to lead ManSEDS?**

As a person in my 3rd year in this university, I have watched ManSEDS grow and expand, gathering more and more people and setting more and more impressive goals each year since its launch a few years back. So, when last year someone asked me how much I want to contribute next year, I decided to double down.

### **All of ManSEDS members have a unique passion for space, where did yours come from? Why space?**

I guess my adventure with Space started a long time ago, when my age was still in the single digits - I believe it started when my parents acquired their first computer with access to the Internet, which significantly widened and deepened my world: I now possessed vast and colourful collection of information right under my fingertips. I remember spending long hours looking up terms from science and technology on, newly created at the time, Wikipedia. I suppose it might not have been as reliable as today in terms of accuracy but being a child, I lacked the idea of false news. I remember memorising concepts like stars, quasars, pulsars, H-R diagrams, declination, etc. The

first time I read somewhere that the universe is infinite, it made such an impact on me, I wouldn't leave the house for a week.

Fast forward a few years, I find myself in a university, studying for a degree and feeling somewhat anxious about the future, as I imagine many of you do. Still, I believe it is crucial to preserve that child-like fascination, which might have been the most important reason you chose your course. ManSEDS strives to help you not only protect but also develop and expand that excitement you have about Space and maybe one day be the very thing that will inspire someone else to follow the same path.

### **What do you value the most as a ManSEDS member and as this academic year president?**

While being the president is a lot of work, I cannot say I ever regret making that decision. ManSEDS has been a massive part of my university experience since Year 1 and I couldn't be more grateful of its existence in my life: it helped me develop skills, make friends and opened opportunities I didn't know were possible for someone like me.

### **What is the experience like for a new member? Can you tell the new members ...**

Well, now it is time for you to experience ManSEDS in your own way - will you join one of our workshops or dive deep into one of the competition teams? Will you fly Rockets or Balloons, design Rovers or CanSats? The choice is yours! I, for one, am really excited to see what all of you will accomplish in the upcoming academic year.

## ManSEDS Projects

As a member of ManSEDS, you can choose to work with any of our current projects. We asked all of our project leaders to talk a little about their plans for this academic year.



(Click on each logo for more info and contact)

### Mancunian Balloonian

By Joshua Green

Mancunian Balloonian is a high-altitude balloon project that intends to maximise the functionality, and fun, of high-altitude balloons. We intend to do this by launching an experiment designed by last year's group whilst you learn the logistics of launching it, then set you on the path to designing your own. However, this seemed like any old HAB experiment so why not send one around the world, or launch a glider off one, or launch a rocket off one? Answer: I don't know, let's do all of that, collaborating with the UAV society and Rocketry project to give you essential skills in interdisciplinary and inter-team work as well as hands-on logistical and engineering experience.

The structure of the project will be done in weekly meetings in which we will discuss the progress to each goal. Initially, we will be focussed on launching the current payload and the first glider launch, in which we are responsible for the deployment method. This



will hopefully cover all the basic technical skills you will need for the next projects. In the second semester, we will begin to design an experiment for next year as well as launch the pico-tracker at least once, allowing you to be more autonomous and test your skills whilst accounting for exam periods and helping out. Throughout the year we will work towards launching a rocket from a balloon, however, this is a very recent goal.

Our main objective is to transfer skills in design, electronics, physics and coding, to you so you can continue with awesome projects in or out of Mancunian Balloonian.

### Manchester CanSat

By Alex Shelley

Project's main goal is to provide students with a platform to excel as engineers and develop their skills to become better graduates. We achieve this through four activities.



The US CanSat Competition is an annual international competition that requires

students to build a remote sensing satellite to gather atmospheric data in a design-build-launch format. Our team for the US CanSat Competition comprises 10 students from varying degrees to provide experience in the full life-cycle of a project. Last year, Manchester CanSat Project (MCP) won the competition with an overall score of 101.6%.

Our weekly workshops are designed to introduce students to learning spacecraft skills and providing an opportunity to gain hands-on experience. Each week, students will be taught a new skill and then put it into practice during each workshop. The students will work in teams of 6-7 students from varying degree backgrounds. As the workshops come to an end, the students will have ultimately produced their own CanSat which they will be allowed to enter the UK CanSat Competition.

The UK CanSat Competition was founded by MCP and is designed to be relatively similar to the US CanSat Competition. This year, MCP aims to expand the Competition further and convince more universities to get involved in this great experience. Last year, MCP won the UK CanSat Competition and we also awarded the Best Presentation award.

In terms of outreach activities, Manchester CanSat Project has always taken part in university Open Days, Welcome Week fairs and events such as Big Engineering. However, this year we are expanding into helping high school students with the ESERO CanSat Competition to provide knowledge and garner interest in the STEM field.

## Lunar Rover

By Robert White



The Lunar Rover project involves designing, building and testing a rover capable of making a round trip on rocky and hilly terrain (simulating the lunar surface) in order to collect dry ice samples.

At the end of the academic year, the annual UKSEDS competition is hosted at the RAL Space facility at Harwell Space Campus. Much like in industry, our rover is subject to rigorous constraints and approved by space sector representatives via a PDR, a CDR and a presentation in the months leading up to the competition.

In the 2018 competition, the ManSEDS rover came 3<sup>rd</sup> overall out of eight competing teams and achieved 1<sup>st</sup> for the outreach award. The project had active members from the Schools of MACE and Physics and Astronomy gaining experience with CAD, robotics, electronics, and construction, as well as project management and report writing.

However, the motors used on the joints of the robotic arm were underpowered, meaning no dry ice samples were collected. This must be a focus of this year's entry! With the arm requiring a complete redesign. The drive system was very successful, and controlled by entering strings of code at a time for navigation; however, we intend for this year to have more responsive control, i.e. investigating the possibility of using a controller. Another objective is data

acquisition: last year we considered cameras or FLIR sensors, which can sense the dry ice on the terrain at the competition. This would be a plus for the innovation of the rover, which is a separate award at the UKSEDS competition.

## Rocketry

By Elliot Tait

The ultimate goal of the ManSEDS Rocketry project is to develop and build an autonomous self-landing rocket, capable of carrying an experimental payload. To achieve this ambitious goal, we will be teaching all members the skills required to design and test each aspect of a self-landing rocket, where everyone will contribute to the final model. We will start with refining and optimising last year's high-performance rocket, which will be launched as part of the UKSEDS rocketry competition. As it stands our current design has a very promising future (previous tests suggest we can achieve a podium finish). This first step will allow all members to learn the basics of rocket design via weekly work session, as well as workshops on topics such as computer-assisted design (CAD), simulation, and coding.

The next phase will aim for members to acquire their Level 1 rocketry certification.



This will involve independently building and launching a rocket at one of our monthly launches.

As we move into the new year, we will build a much larger rocket that can be used to test the systems required for autonomous landing, such as attitude control, thrust vectoring, and a hybrid motor. Each system will be developed by smaller groups of members who are particularly interested in the relevant technology and tested at the monthly launches.

Finally, each group will see their hard work assembled in the first student-built self-landing booster. Further expansion of the project could see us use this booster for launching a second stage (which launched from its apogee should break the sound barrier), as well as launch a rocket from a high-altitude balloon.

Throughout the year there will be plenty of outreach opportunities and trips, such as the National Space Conference, where members can network and learn vital practical skills that are often skimmed over in university courses. In summary, if you want to be part of a unique project and hone your existing skills and develop new ones while meeting like-minded students, professors and employers of the Space Industry, the ManSEDS Rocketry project might just be for you.

### Next month:

- We will have a look on upcoming social and events for this year.
- A look on the project's workshops

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