

The UK Space Design Competition

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Abstract

The UK Space Design Competition (UKSDC) is light years ahead of your average after school science club. The challenge is open to all secondary students in the UK, inviting schools to recreate their own aerospace company and respond to a futuristic proposal for the relocation of a space colony. Throughout the year, the schools compete either at regional heats or in an online video competition, the winners of which attend the UK final at Imperial College London in March. Twelve students from the winning team will be invited to NASA to represent UK in the international final later during the summer. We've been lucky enough to catch up with some of the 2015-16 winners and technical volunteers to hear about their experiences.

The two-day 2016 UK Final was held during British Science Week at Imperial College London. The five aerospace companies comprised of over 220 girls and boys representing 20 different European schools, colleges and science clubs. This year's mission was to create a space cruise-liner that could accommodate 2,500 full-time residents on an 80-day transit to Mars. Before the designing began, each company appointed a president, vice-president and management team and was assigned an experienced engineer as Chief Executive Officer (CEO). The companies designed living quarters, robots and maintenance systems, alongside detailed descriptions of their schedules and projected costs. A panel of industry experts and academics judged the proposals based on their thoroughness, credibility, balance and innovation. If you choose to enter the UKSDC, you'll soon realise that it doesn't take long for the companies to become experts in their own right. Beyond technical ability, the competition doesn't only prepare the students for careers in the aerospace industry, it also encourages teamwork and creativity when tackling scientific problems. The winning team this year was formed of students from Bishop's Stortford College, Haberdashers' Aske's School for Girls, St Mary Redcliffe and Temple School, Sutton Grammar School and St Lawrence College, Athens.

How does the UKSDC compare to other science competitions?

For Victoria Farrant from Bishop's Stortford College, it's in the scientific content, "The UKSDC is an excellent opportunity to get to know pupils with similar interests from other schools and to work with them as a team. Since our school first competed, we've been watching out for engineering developments in the international space station. During the challenge we had to consider all of the aspects of a real-life living and working community, including zero gravity exercises, high gravity play-areas, food, oxygen production, waste disposal and power generation, plus budgeting and producing a 50-page business case to win the investment."

These finalists are thinking way beyond the constraints of the Earth's upper atmosphere. Anthony Apostolakopoulos at St Lawrence College, Athens, says: "The UKSDC was a great experience packed with lots of excitement and work over such a short period of time, highlighting the importance of teamwork in engineering. Deep within the Earth Science building at Imperial College London, our company headquarters were alive with directors frantically trying to coordinate team members so that we could meet the pressing deadline. Having everyone working together for one common goal is a truly amazing experience and unlike our experiences of science at school. With competition being so fierce, we knew we were working with some of the brightest young minds in the country."

What did you enjoy most?

You'd be forgiven for expecting a £1,500 pizza delivery to top the list of the "most enjoyable" parts of the UKSDC. Remember, these aren't your average students.

"By far the most satisfying part of the event was to see the project unfold and develop. At first there is a general excitement and chaos as everyone pitches in with new ideas and concepts for the cruise-liner. An endless array of new problems began to emerge, with each solution giving rise to countless new issues that need to be addressed. After hours of debate and compromise, the structure began to materialise. After this our designs, enthusiasm and competitiveness increased exponentially, running late into the night as everyone frantically tried to finish for the morning deadline," says Anthony.

Aside from winning, Victoria sees the world beyond her UCAS form – the UKSDC helped her to develop, "team-building skills, as well as offering the opportunity to work on an industry-like proposal".

Was it worth the effort?

The winning team managed barely an hour of sleep between them before their 35-minute presentation to the judges. Victoria

wasn't at all fussed, "We worked all the way through the night, having started at 9am on the Saturday, and finished at 4pm on Sunday, as the winning team, and now 12 of us are going to represent the UK in the International competition at NASA in Florida in July! How cool is that?"

Anthony "felt an immense sense of achievement watching the final design being presented in front of the judges". When "comparing the final product to the initial panic that our design was too far-fetched, we got an even greater feeling of accomplishment – in the end we pulled through and we did this. There was an almost overwhelming feeling of pride as we defended our design from the judges' demanding questions and tried to convince them to fund our company. What the UKSDC does best is to emulate what it would feel to work in a highly competitive but incredibly rewarding company."

The finalists of the UKSDC are so enthusiastic they frequently come back as volunteers and senior advisors, with the constantly evolving competition sustaining their interest year-on-year. Trisha Saxena, an undergraduate physicist at Imperial College London, competed for two years with her school and, having been chosen to represent the UK at the international final last year, was inspired to continue working behind the scenes. Since then she's been involved with the organisation of events, has judged regional heats and returned to the UK final as a company CEO. As CEO Saxena supervised 50 students for the two-day challenge, inspiring the school pupils with her tales from the NASA space centre, sharing her inside-knowledge and circulating pizza deliveries. While her team certainly loved having such an experienced CEO, she wouldn't give too much of the game away and let their imaginations take centre stage. Priya Pereira, another UKSDC alumni who represented the UK in Florida is always, "astounded by the ideas students come up with and the way relative strangers work together". "Without a doubt participating in the competition was one of the most stressful experiences" she's ever experienced, but it taught her some of her "most valued life lessons and helped forge friendships that will undoubtedly last a lifetime".

This year's finalists included GCSE students who dabbled in space science on their weekend and sixth form students who were keen to push themselves outside of the curriculum. While the majority are intent on studying engineering or physics at university, there were future doctors, journalists, and forensic scientists. With the turnover from the UK space industry reaching a staggering £11.8 billion annually, we see a bright future for our aerospace engineers.¹

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Reporter: Jess Wade, new YSJ Ambassador and Editorial mentor, PhD candidate in physics at Imperial College

Read more about The UK Space Design Competition at uksdc.org

References

1. The Case for Space 2015, The impact of space on the UK economy, London Economics
REFERENCE LINK