

IET International Travel Award – Final Report



The 8th series of Space Propulsion Conference highlights the technical and programmatic aspects related to the development and application of Space Propulsion technologies. The event highlights technical innovation and issues within the field, and promotes the exchange of views and information in two main areas of propulsion: spacecraft and space transportation. I was incredibly honoured to present my MSc project investigating the '*Development of a Minimum-Thrust Additively Manufactured Aerospike Nozzle Thruster for a Small Satellite Propulsion System Powered by HTP and TMPDA*' in Estoril, Portugal in May 2022.

The 4-day conference brought in more than 560 professionals from over 35 countries, gathering engineers and scientists from government, university, and industry. The conference was a unique opportunity to discover pioneering solutions to real world space propulsion challenges, and implement fruitful exchanges between colleagues of different nations and disciplines. My primary aims for attending were to; create meaningful connections and contacts for future career progression, identify future trends within rocket engine developments, and discuss my MSc thesis findings and conclusions with leading industry experts to receive constructive feedback and further recommendations, all of which I achieved over the duration of the event! I also wanted to represent the UK in an international forum which supports the preparation of future activities and roadmaps in all fields of space propulsion.

I found that I gained a wider appreciation of ground-breaking and disruptive space propulsion technologies for a multitude of different disciplines, including in-space applications, launchers & exploration vehicles, helicopter missiles, and UAV technology. It also provided me with an opportunity to promote my research amongst my university peers and young graduate work colleges, and from being a Member of the IET, I can now share and give back to the broader IET community about my knowledge and experiences. Another major benefit of giving an oral presentation was to improve my communication skills on a global platform, as well as my written communication when submitting the final paper. The presentation itself was included in the '*Novel Materials and Processes for Propulsion*', and covered aspects of the overall design of the thruster from the propellant investigation, material selection, manufacturing methodology, injection system considerations, propulsion integration and the CAD modelling.

It was also great to attend the social aspects included as part of the conference, with one traditional Portuguese buffet at a local reception in Lisbon, and a formal gala dinner with an official award ceremony at the end of the week. Keynote speakers ranged from; the current program status of

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Vega C and Ariane 6 launch vehicles, engine developments for European small launchers, breakthrough propulsion considerations of the future and the maturing technology of using green propellants, all of which brought a new and refreshing perspective and insight into cutting edge expertise. There was also ample opportunity to attend technical sessions ranging from modelling and experimentation, test facilities, spaceports, air breathing propulsion and novel recovery systems for solid rocket boosters. On the final day, I conducted a technical visit to the *Institute for Systems and Robotics – ISR* which is a research institution affiliated with *Instituto Superior Técnico (IST)*, in the fields of Robotic Systems and Information Processing. This was incredibly beneficial to gain a wider awareness of Portuguese capabilities within this field and understand the relationship between this institution and academic partners.

As I am in the early stages of my career path, the networking opportunities that this conference enabled were extremely valuable. Meeting leading industry experts, ESA technical officers, and esteemed academic professors all at the forefront of space propulsion innovation was an extremely beneficial and rewarding experience.

I am extremely grateful for this generous opportunity that the IET granted and want to reflect that gratitude in supporting future IET projects and awards throughout my career in the space industry. I feel as if this paper marked the start of my scientific contribution to the global advancement of space propulsion technologies, and I was extremely proud to present this paper at such an esteemed and reputable international conference.

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