

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)  
In Orbit - Postgraduate Space Education (4)

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BENEFITS OF ESA GRAVITY-RELATED HANDS-ON PROGRAMMES FROM THE STUDENTS'  
PERSPECTIVE**Abstract**

The past decade has seen further development of various types of student-focused programmes in the aerospace industry, including the European Space Agency's (ESA's) suite of gravity-related student experiment programmes. These opportunities enable student teams to propose and conduct research experiments on altered gravity platforms, including a drop tower, a hypergravity centrifuge, an aircraft performing parabolic flights and on-board the International Space Station (ISS)! In a sector with significant barriers to entry, these programmes offer students a practical end-to-end research experience and an introduction to working in the space industry.

This paper will explore the benefits and challenges unique to each of ESA's 'Spin Your Thesis!' (SYT), 'Fly Your Thesis!' (FYT), 'Drop Your Thesis!' (DYT) and 'Orbit Your Thesis!' (OYT) educational programmes, from the perspective of the 2021 student cohort. The programmes will be compared and contrasted, highlighting the changes in approach and methodologies depending on the platform. This interdisciplinary cohort is split into 8 international teams, each consisting of students from a wide range of cultural and/or educational backgrounds. The role of this diversity in successful collaboration is examined, discussing whether teams from diverse disciplines can collect higher quality data on a wider range of topics. Diversity is also evident in the selection of experiments being performed on the four altered gravity platforms. Research topics range from attitude control, acoustic levitation and debris removal technology demonstrations, to biological process simulations, and smart granular gases. An

overview of the individual projects and their anticipated outcomes will demonstrate how this research relates to ongoing research in the space sector. Finally, the impact of the COVID-19 pandemic on the undertaking of these programmes is assessed, with this cohort taking part in these programmes in a virtual format, often without direct contact with other teammates.

The results of this paper will not only benefit future students hoping to take part in these altered gravity programmes, but will also emphasise the benefits of these opportunities, both for the participating students and the space industry.