



What is GU Orbit?

GU Orbit is a student-led society at the University of Glasgow with the mission of developing satellite technology that enables students and researchers to partake in the growing space industry. Glasgow produces more satellites than any other city in Europe; therefore, we find it fitting for the University of Glasgow to lead the way in student innovation of space.

The team consists of over 60 members with a variety of academic backgrounds, including engineering, business, informatics, and arts. This vast group of people are motivated to design and develop our first micro-satellite.

Named after the mythological Ancient Greek God of the Stars, Astraeus-01 will carry our first mission to space. With a planned launch in 2021, this 3U CubeSat will cement our society's participation in the new space era, opening the initial doors to the exploration of an infinite universe.

Astraeus-01

The first payloads to reach the edge of space will demonstrate two innovative technologies: a deployable drag sail and a graphics processing unit (GPU). They will be flown to Low Earth Orbit on our 3U CubeSat (10x10x30cm) built in house. CubeSats were originally seen as a platform to be used by educational institutions for tests and experiments, however, due to their low manufacturing costs and large variety of commercial-off-the-shelf components, they have gained increasing popularity.

Space around Earth has become cluttered with what is known as "space debris", which is mainly made up of discarded rocket stages, satellites that are currently out of commission, and even chips of paint from spacecraft. When these objects collide, they break up into smaller pieces which worsens the problem and put other spacecraft at risk. When the satellites "Iridium 33" and "Kosmos-2251" collided in 2009, they generated approximately 2,000 trackable pieces of debris. The drag-sail payload on Astraeus-01 will be stowed within one end of the 3U CubeSat and will be deployed to de-orbit the satellite after it has carried out its main mission in orbit to mitigate space debris. The unique design of the drag sail, developed by faculty at the University of Glasgow School of Engineering, will allow it to actively align itself with the maximum angle of attack and provide stability to the 3U CubeSat. This will ensure the fastest possible de-orbit time while also inherently contributing to the stabilisation of the CubeSat for a plethora of other applications. The drag-sail design may also be used as a light sail in a future mission to provide stability as we harness the energy of the sun to propel ourselves to distant planets.

Our second payload supports the main mission of Astraeus-01, by integrating GPU hardware to perform deep learning applications in space. We are at the vanguard of a new era; entering a time of human colonisation in space. Our team is dedicated to building innovative technologies which will enable our exploration of the solar system. We have identified the stepping stones toward this future to be the development of autonomy and artificial intelligence for robotic and crewed missions. Limited downlink capabilities and increased sensor data provides opportunities for edge computing in space. Our GPU will be a proof of concept for testing this technology. By connecting it to a high resolution camera, the GPU will perform digital surface modeling, which has future applications beyond our planet.

Our first satellite will pave the way for further development of innovative technologies in space.