

19th IAA SYMPOSIUM ON SPACE DEBRIS (A6)  
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Author: Mr. Robin Hague  
Skyrora Ltd, United Kingdom, info@skyrora.com

## SKYRORA'S SPACE TUG

### Abstract

Skyrora is a UK launch vehicle provider with an environmental conscious at the forefront of its focus. Skyrora aim to support government plans for space sector growth and improved sustainability within the space industry by producing innovative technologies that either prevent harm to the environment or greatly reduce the harm caused to the environment by methods and technologies utilised within the space industry. In 2014/15, the total income of the UK space industry grew to £13.7 billion, though growth slowed to a measured rate of 6.5%. In addition, Sustainable Aviation UK predict exponential growth in the industry over the next few decades and by producing an eco-aviation fuel from nonrecyclable plastics, Skyrora has the opportunity to lead the way in the development of a sustainable aerospace and domestic aviation sector. The maneuverable third stage of the Skyrora XL launch vehicle, also referred to as the Space Tug will offer an abundance of environmental benefits. The Space Tug will allow multiple payloads to be deployed into their chosen orbits from the same launch, minimising the environmental impact of rocket launch by reducing the number of launches required to operate. Estimated to be in orbit around the Earth as of January 2019; over 128 million pieces of space debris smaller than 1cm, approximately 900,000 pieces of space debris between 1cm and 10cm, and 34,000 pieces of space debris larger than 10cm. It has been estimated that approximately 80 tonnes of space debris will re-enter the Earth's atmosphere every year, however the majority of this debris will burn up in the atmosphere. The heat caused by the friction from this process has the potential to melt the space debris, the chemical reaction from which often releases nitric oxide; a gas that causes further damage to the ozone. Skyrora's Space Tug will have the potential to remove defunct satellites from orbit, and to transport these satellites and other space debris to disposal orbit. With the ability to de-orbit itself after use, the Space Tug will fall back to Earth and burn up in the atmosphere, omitting very little pollution and thus preventing further proliferation of space debris.