

Unfolding Space Engineering Origami

Code: 21/32

Company: B2Space

Location: Newport, South Wales + Remote working

Company Description:

B2Space is a UK start-up, based in Wales, with the mission of making space affordable for more companies and organisations. Our main goal is to be the first UK private company to launch small satellites to LEO from UK.

For that, we are developing a high-altitude launching system based on the rockoon concept. Currently we are performing a proof-of-concept project, which will see B2Space launch a small version of its system that will reach 100km of altitude, before the end of Q2 2021.

In parallel, making use of the stratospheric expertise acquired, B2Space has developed, in partnership with ESA BIC UK, a near space test bench, that gives companies and research institutions an unrivalled opportunity to test their technologies in conditions similar to the ones they will face in orbit.

Additionally, B2Space is also developing HAPS systems (High Altitude Pseudo Satellites) that will be used for several purposes (surveillance, Earth Observation).

Having received funding from the Welsh Government, ESA, UKSA, STFC, HIE, and having raised as well substantial private investment, B2Space is quickly growing and looking forward to welcome new team members.

Project Description:

Expandable or deployable structures are a key part of the space industry, as anything which is used in space must be stowed inside a fairing prior to launch. To put this into context, the solar arrays on the ISS would cover half of a football pitch, but they must be launched in a volume which is not much larger than the goal. Origami provides a potential solution to this problem, allowing these larger structures to be folded into smaller packages. The applicant will explore the feasibility of origami to solve these problems, with a specific focus on its application as an expandable manned module similar to the BEAM module currently on the ISS. This could guide the direction of design of future manned modules in LEO or beyond.

In order to achieve this, the applicant will consider the requirements of a deployable habitable volume in space both from the perspective of the potential market and environmental constraints. These considerations can range from the power and mechanical requirements of deployment, to exploring the structural implications of using these folded

structures, and will require the applicant to look beyond simply the mechanics of deployment and consider the system as a whole. This will enable the applicant to select an origami fold pattern and design a prototype expandable module in a virtual environment, and potentially construct a small-scale physical proof-of-concept demonstrator.

This will help the applicant to build their skills in:

- Capturing requirements from both market requirements and physical constraints
- Kinematic mechanism design
- Systems engineering
- Guiding a project from an early stage
- Concise and clear verbal communication to informed and not informed audiences

Applicant Specification:

An open-minded 3rd/4th year undergraduate or PhD student in Engineering, Physics, or Maths.

Minimum Requirements:

- Background knowledge on the challenges associated with spaceflight
- Willingness to approach an open problem where there is no single right answer

Preferred Additional Requirements:

- Programming experience (preferably MATLAB)
- Be able to deal with and learn from mistakes to grow and develop an idea
- Beneficial but not essential to have an appreciation for engineering origami

Further details:

8 weeks minimum fixed term contract to be agreed with successful candidate. Virtual Induction Event to be held on 21 June, 2021. Ideally to complete before the start of the next academic year. Salary is £1,250.00 per calendar month gross.

Closing Date for Applications: 5pm Wednesday 26 May

Applications should be made through the online form attaching a CV, before the closing date. Please note that elements of the form left incomplete will be deemed to render the application ineligible. They will be checked for eligibility and forwarded to the employer.