The MTC, in partnership with Oxford Brookes formula one students has used AM to produce titanium uprights, enabling a weight saving of 50%. The motorsport car was awarded: TOP UK Team Overall and 2nd Overall.

We’ve made a 50% reduction in un-sprung mass by using AM. These technologies transform the way you design parts, you can now do things that were previously unthinkable in terms of geometries.

Joe Panik, Oxford Brooks University

**THE CHALLENGE**

MTC engineers and Oxford Brookes had to design, manufacture titanium complex uprights within four weeks for the motorsport race car. Key challenges for this project included:

- Producing fully functioning parts by AM that could be validated for racing. This included design, manufacture, inspection and machining.
- Achieving the optimum weight savings whilst maintaining safety margins for extreme loads experienced on track.

**THE SOLUTION**

- In partnership with Oxford Brookes students, the MTC supported and reviewed the complex design for AM manufacture of the upright brackets.
- All components were manufactured in titanium using the Electron Beam Melting (EBM) process at MTC, home to the National Centre for Additive Manufacturing.
- Non Destructive Testing and metrology techniques were utilised to ensure that all parts achieved the required quality standard for use on the car.
THE OUTCOME

- Demonstration of AM for use in a safety critical motorsport application.
- Component weight saving of 50% using AM compared to conventional machining.
- The AM uprights supported the OBR car achieved multiple awards:
  - 2nd Overall team
  - 2nd Engineering design
  - Top UK car
  - 2nd Skid pad
  - 3rd Endurance
  - 4th Cost and Manufacturing
  - 5th Efficiency

THE BENEFITS

- Assessed the maturity of AM for use in future motorsport applications.
- Demonstration of full method of manufacturing, including validation.
- Functional, dynamic test feedback from AM components.
- Development of best practise in datuming features for post-build machining operations.