

# ADDITIVE MANUFACTURING OF MOTORSPORT UPRIGHT BRACKETS

## Racing ahead with additive manufacturing

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

