

Future of Lightweighting Entry



Moto-Maqlab-UC3M

Hybrid EMS Frame Body: Swingarm

Hybrid EMS structures are built by 3 different materials and manufacturing techniques, the main components of the final structure are: a 3D printed core, a carbon fiber skin and aluminum alloy . These structures integrate additive manufacturing thermoplastics (ULTEM1010) as a topological optimized core. The core is designed to house the metallic part (where mechanical joints are required), as a layout body necessary for the final geometry and to solve aerodynamic requirements of the structure. The woven carbon fiber structure provides 95% to 99% (user defined) of the components overall stiffness. Ply-based modeling is also studied (ply stacking and orientation). Topological optimization was also applied to the metallic parts. This results in 40-60% weight reduction depending on the user's stiffness request.

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