



AEROSPACE & AERONAUTICS

Light Metal Alloys

6_A&A_LMA_MACOLI

Title: Clean and high-performance machining of composite and light metal alloy stacks

Description: The new CRFP, CMC and Ti/Mg alloys are bringing with also challenges how they can be more sustainably machined, in individual or stack applications. The solution has to meet higher performance, higher quality in combination with more health and environmental acceptable solutions – NO oil-based emulsion usage

Scope:

- Higher productivity
- Lower machining/manufacturing costs
- Substitution of oil-based emulsion
- Clean and dry machining process (especially in CRFP materials this improves the functionality of the produced parts)

Objectives:

- Find the solution for novel machining/processing of light weigh metals (Ti alloys, Mg alloys, Al alloys)
- Find the solution for novel machining/processing of CMC materials (C/C–SiC) and stuck structures with metals (i.e. Ti)
- Find the solution for novel machining/processing of CRFP materials and stuck structures with metals (i.e. Ti)

7_A&A_LMA_ILOSI

Title: Innovative Lightweight structures for Optronic cameras and systems for Space Instruments

Description: Satellite payloads are nowadays encompassing more and more optronic systems, e.g., remote sensing instruments, cameras to provide imagery, star trackers etc... With the current boom of the Newspace and the development of nanosatellites or Low Altitude Platforms, the weight requirement of such assemblies becomes the main driver.

This challenge consists in proposing innovative lightweight material solutions to improve the weight of the instruments, and address their compatibility with the space sector and requirements, to enable innovative materials and assemblies to be used in this field

Scope:

- In space satellites, instruments weight is varying a lot for cameras, from 300kg for standard satellite payload (ex. Sentinel 2 MSI Instrument) up to a few kgs for smaller instruments (e.g. compatible with nanosats)
- The mechanical structure must be as light as possible, mechanically robust, and compatible with the optronic components: detectors, electronics, lasers etc..., contributing to thermal regulation to enable proper functioning of electronic parts; specific parts of a camera can be explored in a first instance if deemed necessary (ex. typical detector mechanical interface etc...)
- Several materials are conventionally used (see Edeson et. al., Acta Astronautica 66 (2010) p.13); New materials or innovative material post process should be explored in view of enabling weight decrease and therefore performance increase of the whole system, especially for small satellites, nanosats and possibly drones

Objectives:

- Proposing lightweight innovative alternatives to currently used materials,
- Reducing the total camera weight by 10 to 50%
- Addressing -at least theoretically- their compatibility with space requirements as per ECSS-Q-ST-70C section 5
- Possibility to go towards a demonstrator if successful, in the frame of a cooperative project, depending on the outcomes