

POST-DOCTORATE: ADDITIVE MANUFACTURING OF NANOSATELLITE ASSEMBLY

1 CONTEXT

The University Space Center is the French leader in the development and operation of nanosatellites developed by students. It has acquired in-depth competences in the field of design, manufacturing, testing and operation of nanosatellites and their subsystems, as well as in the area of space project management and product assurance in the framework of university space projects. The CSU has an AIT (Assembly Integration and Test) Facility, a CDF (Concurrent Design Facility) and both UHF and S-band Ground Stations. The CSU develops its own 1U and 3U CubeSat nanosatellite platforms with the support of the Van Allen Foundation and both the French and the European space agencies.

2 DESCRIPTION

In a first step, the candidate would be tasked with the mission to perform a review of both the state of the art in terms of additive manufacturing and current knowledge at the University of Montpellier. The project shall aim at reviewing the current mechanical architecture of the 1U and 3U Cubesats developed by Montpellier, select a number of piece or group of pieces which would be improved by additive manufacturing (lighter, smaller mechanical distortion, easier integration, ...). First step deliverables shall be the bibliography and the trade-off report of pieces that are good candidate for 3D printing.

For the selected pieces, the candidate shall establish functional analysis and requirements, shall design, build and test them. The test methods would have to be selected so that they are relevant for space qualification and allow to pin point weakness in the process. Furthermore the project shall highlight the blocking points and next steps in order to use additive manufacturing on CubeSat both in terms of design, process and project related topics. Second step deliverables shall be the fabrication file and test report of the selected pieces.

3 ROLES AND RESPONSIBILITIES

Work in an interactive team environment with, spacecraft developers, research and technological platform of the University of Montpellier

Work on project teams (attend meetings, complete deliverables, contribute to staff discussions and activities)

Interface with project team members to develop product designs

Perform state of the art bibliographic review of additive manufacturing for space application

Become familiar with space constraints and standard (ECSS, Space environment, ...)

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Specify, develop, build/order and test mechanical part built by additive manufacturing

Generate feed back and design guidelines about the advantages and disadvantages of additive manufacturing for space components

Publish results in relevant littérature

Look for future project/funding opportunities on pursuing the work and dissemination of the research

Tutor with students along project and internship

4 QUALIFICATIONS

PhD. graduate

Computer skills (MS Office).

Excellent written and oral communication skills in english

Materials properties and behavior knowledge, including static, vibratory, shock and transient.

Traditional and Additive manufacturing process knowledge

Mechanical design, with CAD software and 2D drawing

FEM Modelling with computer tools including static, vibratory, shock and transient.

Mechanical testing process and laboratory equipment knowledge

Self-starter – ability to function with little direct oversight.

Team skills – ability to work effectively in teams.

Logical problem solving capacity.

Knowledge of the space industry, space standard, processes and/or space environment would be beneficial.

5 JOB CONSTRAINTS

Work on a computer, require work out-of-business hours during satellite commissioning and long-term testing

6 JOB LOCATION

Montpellier, FRANCE

7 POINT OF CONTACT

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