Master Thesis - “Modelling of additive manufacturing deposition for aerospace applications” (30 credits/20 weeks – 1 student)

Project Background

GKN Aerospace is committed to the green transition in aviation. A key enabler for this journey is additive manufacturing, which reduces waste material and energy consumption while increasing design freedom, enabling more efficient products. At GKN Aerospace in Trollhättan we are currently focusing on Directed Energy Deposition (DED) to vastly improve the manufacturing concepts for certain components.

To be able to introduce DED on flying components it is important to have control over the deposition process and to ensure that the deposited material meets the strict requirements of the aerospace industry. One way to increase the understanding of the DED process is to perform simulations of the melt pool. To enable reliable simulations of the melt pool, it is important to have a good approximation of the bead shape that will be produced by the process.

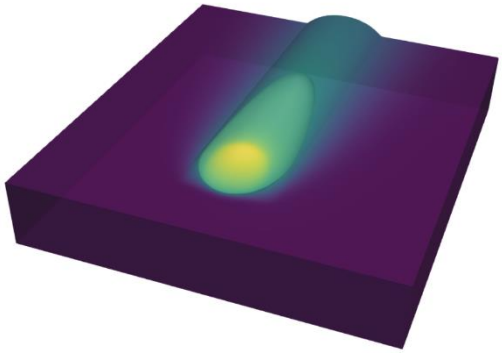
This master thesis project will focus on modelling the bead shape for single and multi-bead deposition.

Assignment Description

The thesis work will focus on:

- Literature review of focused on DED and bead shape as well as on modelling of these [1].
- Use and improve GKN internal tools to predict the bead shape and overlap behaviour.
- Evaluate chosen methodology for estimating the bead shape for single and multi-bead DED.
- Implement logic for bead shape in in-house simulation software.

The thesis work will be supported by appropriate simulation engineers.



Qualifications

- Master in mechanical engineering, engineering physics, computer science or similar.
- Interest in programming and numerical methods.
- Previous programming experience is recommended. The student will work mainly with Python.
- Basic knowledge of Additive Manufacturing is appreciated.
- The student should be capable of taking initiatives on their own.

Application

Send your resume and cover letter to anna.moretti@gknaerospace.com.

Last date for application: 2023-12-15. Interviews will be held continuously and the position could be filled prior to the last application date.

Reference

[1] Ramiro, P.; Ortiz, M.; Alberdi, A.; Lamikiz, A. Strategy Development for the Manufacturing of Multilayered Structures of Variable Thickness of Ni-Based Alloy 718 by Powder-Fed Directed Energy Deposition. *Metals* **2020**, *10*, 1280. https://doi.org/10.3390/met10101280