

Master Thesis - “Effect of Nozzle Powder Flow in DED-Powder Depositions” (30 credits/20 weeks – 1 student)

About us

GKN Aerospace is the world’s leading multi-technology tier 1 aerospace supplier. With 55 manufacturing locations in 15 countries, we serve over 90% of the world’s aircraft and engine manufacturers. We design and manufacture innovative smart aerospace systems and components. Our technologies are used in aircraft ranging from the most used civil aircraft to the world’s advanced 5th generation fighter aircraft and the Ariane orbital rockets used by ESA.

9Project Background

At GKN Aerospace in Trollhättan there is a large focus on Directed Energy Deposition (DED) to both improve products but also come up with new ground breaking use-cases. DED is one of many Additive Manufacturing (AM) methods that is showing promising results to both reduce waste material but also enable designs of more organic products. To be able to introduce DED on flying components it is important to have control of the deposition process and make sure that the deposited material meets the tight requirements in the industry.

This master thesis will therefore be focused on AM using DED using powder as feedstock and the equipment that is necessary for this process. For DED-powder to function properly a great deal of parameters and equipment needs to be understood and be fine-tuned with each other to produce a result that fit these tight requirements.

Therefore, this master thesis project will focus on studying and mapping the effect of the nozzle quality with the help of sensors in the machine. A structured way of working and integration of the sensors will be setup for monitoring of the nozzles and additive builds will be built to investigate the effect nozzle quality has on bead geometry and defects in the material.

Assignment Description

- Literature review focused on DED, nozzle designs, wear and damage of nozzles and its effect on bead geometry
- Understand the process, its equipment and the effect all different components have on the final result
- Design and evaluate DoE to investigate the nozzle effect on final deposition
- Use of different sensors to characterize nozzles in the workshop
- Propose and implement a nozzle characterization sensor into the development workflow

The thesis work will be supported by appropriate process and materials engineers

Qualifications

- Student in final year of M.Sc. studies in mechanical-, material-, automation-,data-science engineering or similar
- Interest in programming and material science
- Previous programming experience is recommended
- Workshop experience is recommended
- Basic knowledge of Additive Manufacturing recommended
- The student should be capable of taking initiatives on their own
- GKN would prefer if the student can perform most of the work on site at the Global Technology Centre organization in Trollhättan, Sweden

Apply by

Send your resume and cover letter to:

David Lindell, david.lindell@gknaerospace.com

Interviews will be held continuously.