



### **Company Information**

<b>Company Name</b>	<i>Oerlikon AM</i>	<b>Date Submitted</b>	<i>11/21/23</i>
<b>Project Title</b>	<i>Design of a Smart Part Tracking System for an AM Factory (OERLIKON_TRACK)</i>	<b>Planned Starting Semester</b>	<i>Spring 2024</i>

### **Senior Design Project Description**

#### **Personnel**

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills.

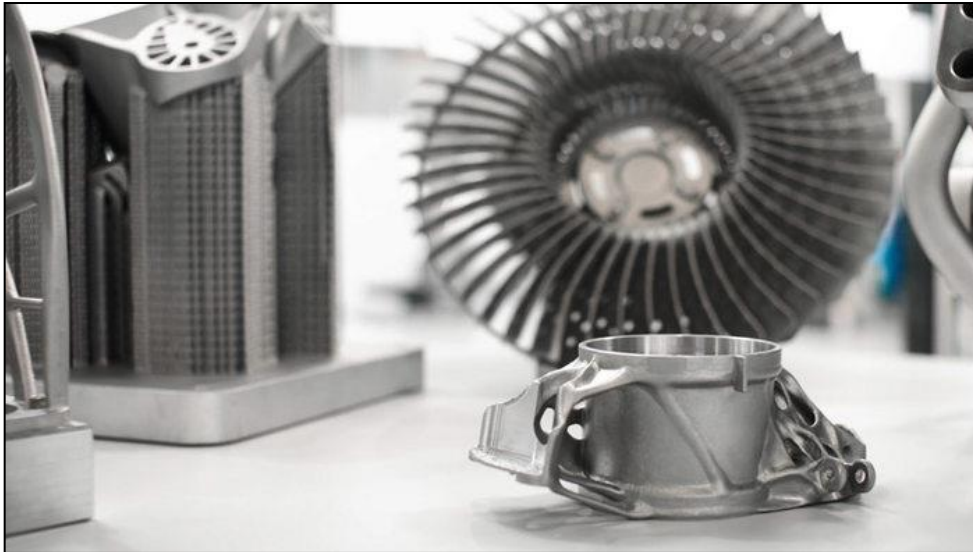
<b>Discipline</b>	<b>Number</b>	<b>Discipline</b>	<b>Number</b>
Mechanical	2	Electrical	0-1
Computer	1	Systems	3

#### **Company and Project Overview:**

Oerlikon AM is spearheading the revolution that is Additive Manufacturing (AM) and metal 3D printing. We have gathered a dynamic team with deep industrial knowledge and have built state of the art facilities specifically for AM in multiple countries. We provide AM solutions with a focus on metal alloys for the Aerospace and Defense industries. We support our metal printing capability with our own metal powder production, research and development, component design, application engineering, and finishing capabilities. We are pioneering AM for all scales of manufacture from a single custom part to series production runs lasting decades across all industries.



## INDUSTRIAL SOLUTIONS LABORATORY



Additive manufacturing allows the creation of new components and designs which cannot be achieved by any traditional manufacturing process. Component weight can be reduced, saving material costs, and providing benefits for the service life of the product. Component strength may be increased, and several components may be combined into one. Manufacturing costs and time to deliver may be reduced, while product performance and durability can be increased. In addition to these many technical advantages, the AM process consumes much less material to produce a component when compared to traditional processes such as machining, resulting in less waste.

This project seeks to design a system capable of tracking builds and components as they make their way through the various stages of the manufacturing process. A successful design will be able to track components without human interaction through a series of sensors and display that information in a digital representation of the facility.

### **Project Requirements:**

The freedom of design enabled by additive manufacturing has driven a wide array of applications, customers, and components to the Oerlikon AM facility. This excitement, while great for business growth, has required employees to build complex systems of spreadsheets and logs to track the status and location of components. These home-grown systems are costly to keep up-to-date and accurate.



Figure 1: Image of the AM Floor and Printers

The primary objective of this program is to design a system and series of sensors to track components through printing, heat treatment, part removal, part finishing, machining, inspection, and shipping. The system needs to be able to indicate physical location within one of these process areas and display that information in an easy to understand digital representation (ex: model of the facility, 2D floorplan, etc). This data should also be able to be exported into a report format which can be used as a reference for program managers and engineers. Possible solutions to this challenge may include the use of RFID sensors and/or GPS tracking devices but these should not be considered firm requirements or limitations. It is up to the team to think broadly about possible solutions and determine how to best solve this challenge.

The team will have access to the metal 3D printing technology used at Oerlikon AM to help in their design efforts if required. This project can be taken as far as the team decides to take it. A stretch goal for the program would be to build a hologram display or augmented reality display to be used in the conference room during production and tracking meetings.

**Expected Deliverables/Results:**

- Design a proof of concept system to track components through the Huntersville AM Facility and provide location data in an easy to understand format.
- Provide the following for the design solution:
  - Bill of material
  - Engineering drawings
  - Operating instructions
  - Troubleshooting and maintenance procedures

**Disposition of Deliverables at the End of the Project:**

Prototype design for the tracking system and supporting documentation will be delivered to



Oerlikon AM at the completion of the project after display at the Expo.

**List here any specific skills, requirements, specific courses, knowledge needed or suggested (if none please state none):**

- Interest in additive manufacturing/3D printing
- Experience with sensors, data collection, and tracking
- CAD and Design experience
- US Citizenship (required)