

Company	Project Level	NDA?
SPEO Products	Bachelor	No

Introduction

The **Electro-Hybrid Actuator (EHA)** is the latest patented product developed by [SPEO](#). It represents a state-of-the-art actuator drive system designed to operate large process control valves, which are crucial components in industries such as oil and gas, hydropower, and fluid cargo pumping systems. These valves currently rely on outdated, energy-inefficient designs, creating an opportunity for significant improvement. SPEO's **EHA** offers a modern, energy-efficient alternative that integrates advanced control systems and modern software technologies.

The market potential for this innovation is vast, given the increasing focus on energy optimization and sustainability. SPEO Products has already secured a letter of intent with a prominent, well-known client in the oil, gas, and renewables sectors, signaling the potential for widespread industry adoption.



Project Description

The goal of this bachelor project is to develop a compact design for a new Electro-Hybrid Actuator (EHA) system that can be produced using additive manufacturing methods at the Mechatronics Innovation Lab (**MIL**).

While another project group will update the existing prototype, focusing on incorporating the necessary instrumentation for condition monitoring and predictive maintenance, this project will exclusively focus on designing a new CAD design based on the updated system architecture. The design should optimize the system for production using modern manufacturing techniques

a) EHA prototype	b) EHA architecture	c) Preliminary EHA pilot concept design

The following tasks should be carried out to achieve the main project objectives:

- 1. Iterative Component Selection and Design Refinement:**
Identify and evaluate compact, optimized components based on the EHA prototype and updated architecture. Iteratively refine the 3D CAD design based on the preliminary EHA pilot concept design, improving integration, efficiency, and manufacturability.
- 2. Prototype Testing and Initial Plastic Printing:**
Conduct an initial 3D printing of the design, including selected components in plastic, at UiA. This will allow for verification of fit, form, and functionality.
- 3. Preliminary Metal Printing at MIL:**
Finalize the design and produce a preliminary prototype using metal additive manufacturing methods at the Mechatronics Innovation Lab (MIL) for initial testing and evaluation.

Depending on the group size, skills, and interests, the following additional tasks are open for discussion:

- **Development of a Digital Twin for the existing EHA prototype at UiA:** This involves collaborating with SPEO and the team working on the current prototype to develop high-fidelity simulation models. These models will be refined into real-time capable simulations that can be integrated with the prototype, working alongside the existing PLC-based control system. The digital twin will also support diagnostics, prognostics, and AI-based predictive maintenance.

Keywords

- Mechanical design
- Fluid mechanics
- Electronics
- Prototyping
- 3D CAD design
- 3D printing
- Additive manufacturing
- Software development (optional): PLC / C++ / Python

Additional Information

A team from SPEO's subsidiary, [Assure AS](#), which is also working on the EHA system, will actively support student projects. This collaboration offers excellent opportunities for students to continue working on the EHA through internships, MSc projects, part-time positions, and even full-time roles after completing their BSc/MSc.

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