

## INTERNSHIP PROPOSAL: Micro Gas Turbine testing unit

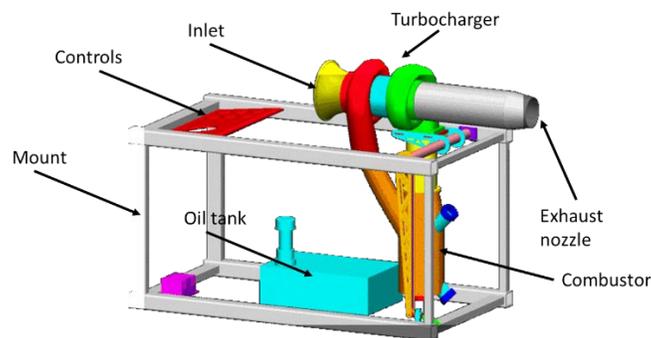
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### Background:

The purpose of this internship project is to perform a detailed design, sizing and cost estimate of a micro-gas turbine test unit using a commercial turbocharger as a main driver (See Figure 1).

At the present, Inholland University of Applied Sciences does not have a real gas turbine testing unit in-house (we have a simulator instead). The main reason is that a full scale gas turbine engine is expensive and it cannot be safely accommodated inside the Inholland facilities. This internship project intends to tackle this problem by creating a small and mobile unit which can be easily transported to a safe location for testing.

The student will use as a benchmark two previous studies carried out at Inholland. The first one is a feasibility study of a micro combined heat and power unit powered by a DGEN 380 gas turbine. The second study is currently being carried out by a team of 4 students from the Gas Turbines Minor and it consists of a conceptual design of a micro gas turbine using turbocharger technology.



**Figure 1:** Simple diagram of a micro GT test unit.

### Proposed activities:

- 1) Literature survey and familiarization with previous work, theory and simulation tools **(0.5 month)**
  - a. Review the previous work done in the field and prepare a project plan
  - b. Refresh gas turbine theory (specifically on combustion)
  - c. Investigate the basic components of the test unit and materials (multiple projects exist already)  
See for example (<http://kne.itc.pw.edu.pl/en/projects/gas-turbine>)
- 2) Select a turbocharger and design a combustion chamber **(2 months)**
  - a. Perform simulation in Gasturb to establish the requirements of the combustor
  - b. Design the combustion chamber and perform a CATIA 3D drawing
  - c. Establish method of manufacturing and estimate the cost of the CC
- 3) Specify the list of auxiliary systems and perform a CAD drawing **(2.5 months)**
  - a. Specify fuel/oil tanks, pumps, start-up system, controls&instrumentation, etc.
  - b. Draw the final system in CAD and perform a cost and weight estimate
  - c. Provide recommendations on safe operation of the bench
- 4) Write report & present results **(in parallel with the rest of the activities)**

### (Some) Student requirements:

- 1) Solid background and interest in Gas Turbine theory and technology
- 2) Good background in thermodynamics and mechanical design
- 3) Proactive and capable to work independently (VERY IMPORTANT)

Interested students please contact Roberto Suarez for an interview/discussion.

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