

## Bachelor's Thesis, Term Project

# Control and optimization for of Flow Meter Robotics system (Rota-Meter) for Oil Gas Industries

**Main Advisor(s):** (Assoc. Prof. Dr. Eng. Amir Roushdy)

**Co-Advisor(s):** (Eng. Ramy Mahmoud, Eng. Malek Mahmoud)

The proposed system utilizes advanced control algorithms and optimization techniques to improve the accuracy and reliability of flow measurement for the flow meter of robotics system in harsh and dynamic environments. The system is designed to operate in a wide range of temperatures and pressures, and can withstand harsh conditions such as high vibration and corrosive environments. The proposed system is also designed to be easily integrated with other control and monitoring systems, providing real-time flow measurement data. **There is a Master's student from Mechatronics Engineering Department, Senior Researchers from ARATronics also available to help and advice and The Lab Engineer from ARATronics, guiding and directing the student with Assoc. Prof. Dr. Eng. Amir Roushdy.**



**Fig.:** Overview of Flow Meter Robotics system (Rota-Meter) at the ARATronics Research Center

### **Project description and objective:**

The system is evaluated through simulations and experiments on a Rota-Meter, showing significant improvement in the accuracy and reliability of flow measurement. This work highlights the potential of

---

For more details please contact:

Assoc. Prof. Dr. Eng. Amir Roushdy, Room: C7.108, E-mail: [amir.ali@guc.edu.eg](mailto:amir.ali@guc.edu.eg), Web site: [www.aratronics.com](http://www.aratronics.com)



advanced control and optimization techniques for improving the performance of flow meter robotics systems in the oil and gas industries

### Research focus of this project:

- Literature review on the project should be studied properly.
- Not only, creating a software control system for the project but also the hardware.
- Experiments using the gadget and control system should be built properly.
- The outcomes must be documented.

### Requirements:

- Passionate to learn more about, Internet of things, 3D Printing design, Robotics and control.
- Prior mechatronic design expertise is desired like "SolidWork and Aruino".
- Enthusiasm for completing actual practical work with 3D printing staff (design fabrication and construction).
- A method of working that is both structured and self-contained.

### General tasks of the project:

- The complete methodology is already available in the ARATRONICS Lab, so we will discuss it from the first day to start the automation process for it
- Fabricate the robot/system using 3D printer/CNC machine (small parts).
- Assembly all parts of the Robot.
- Changing the working variables and see the effect on the locomotion of the robot.

### Other notes:

- A weekly meeting with the advisors will be required for this project, as well as weekly progress updates (*The meeting could be more than once during the week based on your progress and based on your achievements*).
- You should to be in the Lab two days per week (*It could be more than two days based on your progress and based on your achievements*).
- All reports must be prepared in the style of a research paper.
- The outcome of this research will be published in one of the coming international Conferences and , or Jour