

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Interactive Presentations - IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (IP)

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PRACTICAL INTRODUCTION TO AEROSPACE ENGINEERING THROUGH AMATEUR
ROCKETRY

Abstract

Amateur rocketry is an occupation that brings together youngster, students and professional hobbyists. This activity allows for learning through experience, putting and emphasis on sharing knowledge from one enthusiast to another. In an effort to increase the sphere of influence of the aerospace sector in Université de Sherbrooke, an undergraduate student-led workshop titled *Rocketry 101* was designed. Through this activity, participants are involved in the process of assembling their own model rocket and are allowed to directly apply knowledge taught during seminars to given tasks.

The purpose of the *Rocketry 101* workshop is to provide basic knowledge to enthusiasts, accelerating their learning by leveraging their motivation and curiosity. This process also emphasises the application of common safety practices. The workshop was divided into a series of seminars:

- Seminar 1: Introduction to the Theory and Safety
- Seminar 2: Introduction to Rocket Design and Flight Simulations
- Seminar 3-4: Practical Assembly of model rockets
- Launch: Flight of the customized model rockets

The first seminar aims at introducing the participants to key concepts of rocketry, such as *Center of Gravity* and *Center of Pressure*, their concrete influence on a given flight and to approximation methods used. The safety element is further supported through interactive dialogues regarding the current legislation surrounding amateur high-power rocketry.

The second seminar aims at capitalizing on the new theoretical knowledge acquired and allows for experimentation with rocket design using the software tool *OpenRocket*. This tool enables participants to test custom made designs using the suggested flight simulator.

The third and fourth seminars centred around model rocket assembly allow to bridge theoretical concepts with the reality of physical assembly and brings forward feasibility considerations often overlooked during software testing.

To conclude their participation to the workshop, the mid-power model rockets are launched at a special gathering of rocketry enthusiasts. To ensure the safety of the rocket launches, senior advisors from the *Quebec Rocketry Club* are invited to supervise launches and showcase standard launch procedure.

The *Rocketry 101* workshop introduces a learning process based on the participant's curiosity and motivation, providing options and tools to allow for further learning. This workshop has is currently being held is being modified to be completed by high school level students, allowing our future scientists and engineers to participate in an engaging event.