Marc-Antoine Leclerc

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EDUCATION

Master's degree in Mechanical Engineering   **2020-2021**
Université de Sherbrooke**:** Design of an optimized aerial
quadcopter drone for 3D mapping of underground mining sites

Bachelor's in Mechanical Engineering   **2015-2019**
Université de Sherbrooke : Aeronautical concentration

COMPUTER SKILLS

- **Conception:** ANSYS, AutoCAD, OnShape, Siemens NX, SolidWorks
  Programming: Arduino, LabView, MATLAB, Simulink, Python, ROS (beginner)

LANGUAGES

- French (native tongue) and English (writing and listening: 5/5 ; speaking : 4/5)

PROFESSIONNAL EXPERIENCES

Intern R&D with Createk drone, 3IT Sherbrooke   **winter, fall 2018 and summer 2019**

Design of a box to integrate a LIDAR and its electronics on a drone in order to make 3D scans in a mine with SLAM (Simultaneous Localization and Mapping)

- Design and manufacture of a rotary mechanism allowing the rotation of the LIDAR in order to be able to scan the ground and the ceiling of the mines;
- Design and manufacture of a light and waterproof case allowing the integration of the LIDAR with its rotary base as well as the electronics to make the acquisition;
- Design, and test of an isolator to limit the effect of drone vibrations on the data acquisition by the LIDAR.

Design of a new light suspension for drones with super-elastic material to improve landing on inclines:

- Installation of a trigger using an electromagnet for tests with a real drone;
- Design of a new suspension and manufacturing by 3D printing;
- Characterization of a super-elastic material using three-point tests;
- Analysis of the effectiveness of the suspension and different control methods for landing a drone on an inclined plane using data from an inertial measurement unit (IMU) and the VICON motion capture system.

3D design and manufacture of test benches to test a new drone suspension:

- Design and manufacture of a test bench allowing only vertical movements;
- Installation of electronics (distance and inertial sensors) and programming of the Arduino microcontroller for data acquisition and motor control;
- Programming of a digital filter in the microcontroller and analysis of the data during the tests to validate the hypotheses and the simulated models.

Intern in the mechanical department Solutions Novika, La Pocatière   summer 2017

- Installation, connection and programming of a high speed parallel robot using numerical vision to manipulate presented objects on a conveyor;
- Assembly of a machine used as a support for laser welding of nuclear waste containers for the NWMO organization.

Technical support maintenance Pratt & Whitney Canada, Longueuil   fall 2016

- Creation and updating of machine maintenance procedures;
- Creation of procedures with technicians for certification and signature of the geometry of 5-axis CNC machines of the new automated lines;
- Machines KPI (Key Performance Indicator) analysis.

UNIVERSITY PROJECT:

Project HERA (2017-2019):
Modification of a single-seat airplane to make it 100% electric

- Research and choice of engine and controller for propulsion and real powertrain tests on a test bench fitted with a propeller to measure performance (torque, thrust, internal temperature, power consumption);
- Design and analysis by finite elements of the support for the propulsion system (engine, controller, batteries);
- Planning, ordering of equipment and monitoring of manufacturing of the various structures with external companies.

MENTIONS

FRQNT Master's research scholarships of $ 17 500 (winter 2020);

CRSNG and FRQNT scholarships for undergraduate research (winter, fall 2018 and summer 2019);

Mention of excellence on the faculty awards (winter 2016, fall 2017 and winter 2019).

HOBBIES AND INTERESTS

- Assembly of various types of personal drones (flying wings, quadcopters, hexacopters) with PixHawk autopilot system and live video transmission (FPV).