

Tristan Yan-Klassen

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TECHNICAL SKILLS

Applications: SolidWorks (CSWP), AutoCAD, KiCAD, LTspice, MATLAB, Simulink, VBA, Git
Manufacturing: 3D Printing, CNC, Mill, Lathe, Sheet Metal, DFMA, GD&T, PCB Assembly, Soldering
Hardware: Oscilloscope, Signal Generator, Multimeter | Arduino, ESP32, STM32
Embedded: C, C++, Python | I2C, SPI, UART, PWM

WORK EXPERIENCE

Jr. Hacksmith Incoming Sept. 2025
Hacksmith Industries

- Joining the Hacksmith team this fall to bring sci-fi technology to life.

Engineering Intern Jan. 2025 – Apr. 2025
Oxygen8 Solutions Inc.

- Designed and implemented HVAC unit wire harnesses to cut material cost 30% and assembly time 75%.
- Created global electrical standard for unit wiring and standard templates for SolidWorks Electrical.
- Conducted DFMA analysis of Terra 2.0 to reduce part count by 56% and assembly time by 20%.
- Developed prototype electrical boxes for Terra V and Terra 2.0 unit lines.
- Designed PCB to detect shorts and incorrect wiring, halving rate of defects delivered to production floor.

PROJECTS

Smart Tool Rack

- Developed a smart tool rack to follow a user around the shop to keep tools close, able to support 100 lbs.
- Implemented PID control and collision avoidance to ensure tool rack is always safely at desired position.

HMI and Motor Control PCB

- Designed and brought up custom PCB powered off USB C 2.0 to control a multi-scent diffuser.
- Utilized an ESP32 chip for wireless interfacing, motor control, sensor feedback, and SPI LCD display.
- Developed C++ firmware to handle user inputs, sensor data, device state transitions, and display updates.

DESIGN TEAMS AND VOLUNTEERING

Physics Olympiad Coach and Volunteer Lead Jan. 2025 – Present
UBC Physics and Astronomy

- Coached Physics Team Canada to an all medalist result at the 2025 International Physics Olympiad.
- Led team of 10 to found the Canadian Junior Physics Olympiad to prepare students for IPhO selection.

Aerodynamic Controls Development Sep. 2024 – Present
Waterloo Rocketry

- Built 6DoF rocket simulation in Simulink to test canard control algorithms for sounding rocket.
- Independently conducted aerodynamic analysis and FMEA to determine the viability of unlinked canards.
- Designed, modeled, tested, and calibrated a robust mechanical linkage for the canard system.

Team Lead Sep. 2023 – Jun. 2024
Team Canada CanSat

- Led team of 6 to the European Space Agency with a prototype space lander to core and test soil samples.
- Spearheaded design and integration of payload, electronics, and recovery systems into can sized lander.

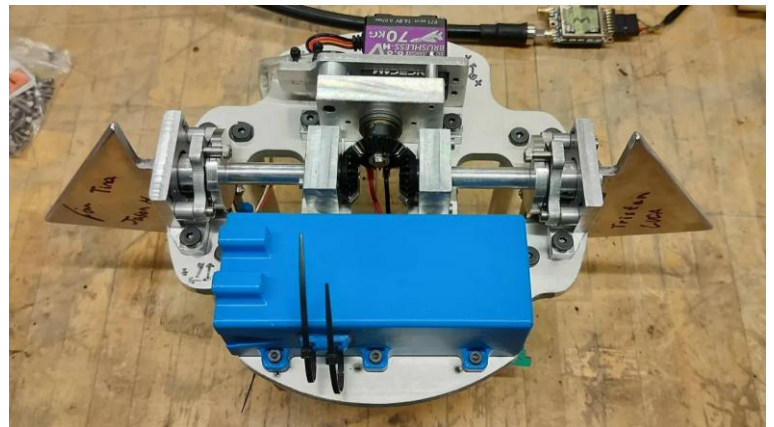
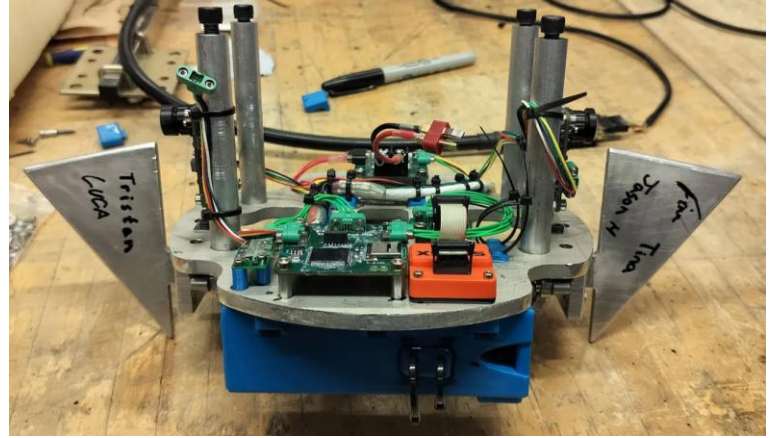
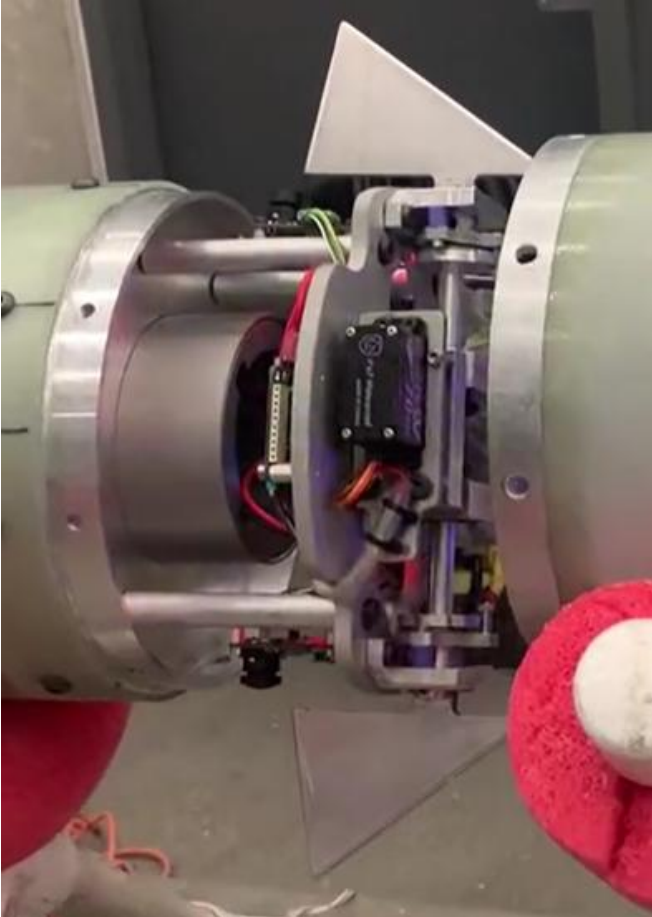
EDUCATION

BASc. Mechatronics Engineering Sep. 2024 – Present
University of Waterloo, GPA: 4.0

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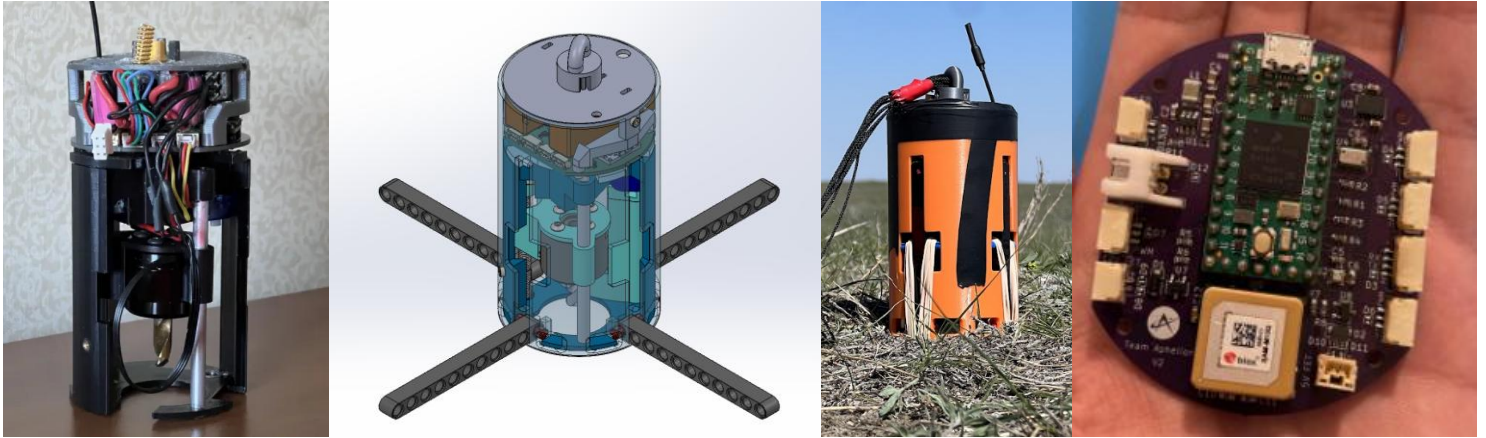
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Sounding Rocket Canards



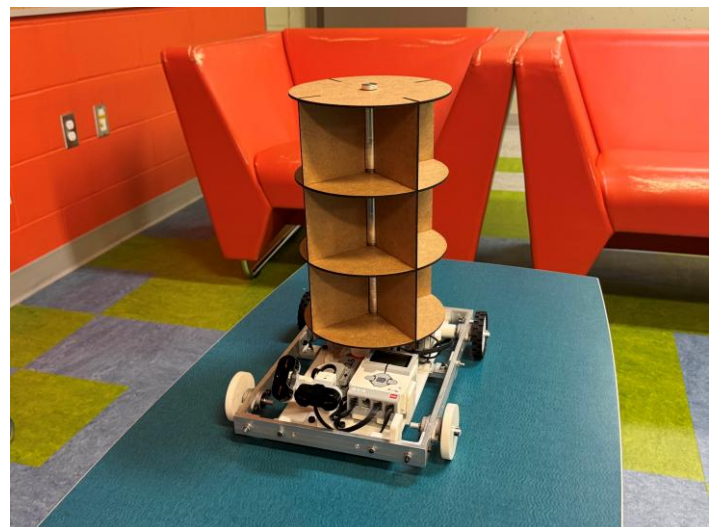
- Designed mechanical linkage for canard system.
 - Designed gearbox to ensure that canards locked to affect roll only with minimal backlash.
 - Calibrated canard positions and programmed servo to limit actuation to safe interval.
 - Incorporated layers of mechanical soft and hard stops to ensure safe operation.
- Conducted aerodynamic analysis of canard behavior and rocket dynamics.
 - Conducted dispersion analysis for failure of unlinked canards, determining non-viability.
 - Developed model for canard flutter, adapting standard models to control surfaces by independently considering aerodynamic forcing and restoring effects.
 - Sized canards for optimal control authority and determined required servo specs.
- Developed aerodynamic forcing, atmosphere, and sensor components of rocket simulation.
 - Used simulation to validate controller algorithm and perform HIL testing.
 - Verified mechanical system and actuator response using simulation.
- Conducted HIL and integration testing to validate system integration and controller response.

Prototype Space Lander (CanSat)



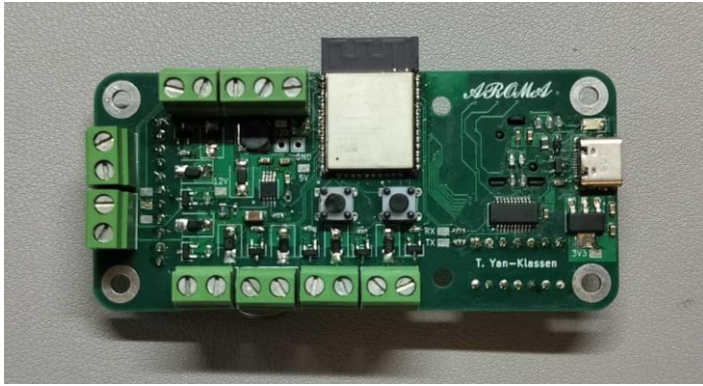
- Designed drilling apparatus composed of landing legs, drill apparatus, and testing chamber.
 - Elastically powered landing legs to upright CanSat upon landing.
 - Custom machined drill bit fastened to motor and deployed via lead screw.
 - Compact testing chamber to test soil sample for presence of amino acids.
 - FPV camera in drill apparatus to remotely operate testing system.
- Designed optimized electrical bay and modelled entire lander to ease integration.
 - Integrated LiPos, radio, recovery, custom PCB, and wire harness into 30mm depth.
- Code, CAD, and more on [project page](#).

Smart Tool Rack



- Designed a smart tool rack to follow an operator around the workshop and keep tools on hand.
- Implemented PID control to smoothly maintain user commanded distance and orientation.
- Developed a collision avoidance system to dynamically restrict movement upon object detection.
- Programmed onboard embedded system in C, using multi-threading to handle concurrent tasks.
- Turned shafts, milled axles, and laser cut shelving to manufacture frame supporting 100lbs.

HMI and Motor Control PCB (Aroma Project)



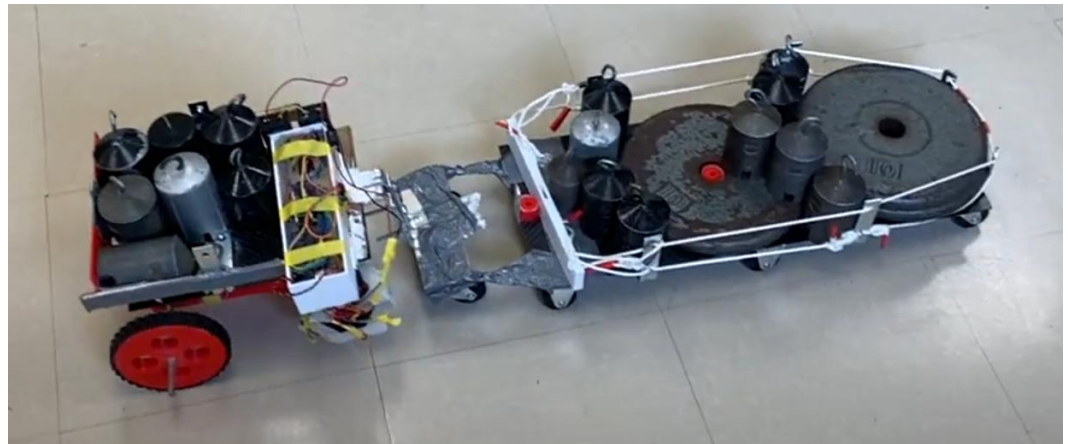
- Control board for multi-scent diffuser device with input via navigation switch and an LCD screen.
- Powered and programmed over USB C via USB to UART converter for ease of use.
- Code and board design files on [GitHub](#).

Quick Connect Tester



- Designed PCB to detect shorts and incorrect wiring, halving defects delivered to production floor.
- Utilized voltage dividers to detect errors, reported type of error and error rate on SPI LCD display.

DC Motor Car



- Built a BLDC motor powered by custom breadboard ESC for maximal power output.
- Designed and 3D printed drive train to tow nearly 100 pounds on two 9V batteries.