

Jan Husak

Mechanical Engineering Student, Politecnico di Milano

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Milan, Italy · EU citizen

Available: from January 2027, for 6 to 12 months

Mechanical engineering student with a strong interest in aerospace and mechatronics, especially design, testing and system integration. Looking for a 6 to 12-month internship where I can apply and grow these skills.

PROJECTS

Project Volans: autonomous drone-in-a-box system · with a PoliMi colleague · janhusak.ch/volans Sept 2026, in progress
Goal: an indoor system where a mission given in plain words is checked and flown by a self-built drone (Faust) that takes off from its own landing and charging station (Base), returns and recharges. Organised as 16 sub-projects across vehicle, ground station, software and test; I lead system integration: requirements, interfaces, mass and power budgets and the safety plan.

- **Faust v0 airframe:** 5-inch quadcopter, about 580 g (CAD estimate), 3D-printed PETG frame with bolt-on arms, sized for thrust-to-weight above 2 and 5+ min hover; arm checked by beam calculation and first bending mode (about 210 Hz vs 160 Hz rotor frequency at hover). ArduPilot with optical flow and lidar for GNSS-free indoor flight, Raspberry Pi companion computer.
- **Base v0:** self-centring landing and charging station; printed cone cups guide each foot onto spring charging contacts, designed to capture the drone from up to 45 mm off, with the cone angle set from the PETG friction angle.
- **Faust Control and Base Control (Python, MAVLink):** mission planning and approval on the Base, autonomous missions and ArUco precision landing developed in ArduPilot SITL before flight.
- **Propulsion test bench:** load cell, current, voltage and RPM logging under a written safety procedure, to measure thrust and efficiency before the drone is built.
- **Designing:** natural-language mission interface with a safety checker; FMEA and automated failsafe tests in SITL; flight log analyser; performance model and SITL digital twin; camera ground-truth tracker; printed-PETG FEM vs bending tests.

Three-stage right-angle gear reducer · with a PoliMi colleague Jun 2025, reviewed Oct 2026

- Designed a 75 kW, 25:1 reducer (bevel plus two spur stages, 17.4 kN·m at 40 rpm), with gears, shafts and bearings sized in MATLAB (Lewis, von Mises, L10 life); full assembly, cast housing and drawings in PTC Creo.
- Re-verified the calculations in 2026: corrected the gear force model, reselected under-life bearings and moved the gears to case-hardened steel after adding a pitting check.

EDUCATION

BSc Mechanical Engineering · Politecnico di Milano, Milan (taught in Italian) In progress

- Mechanical design track, including a 12-ECTS industrial internship.

LEADERSHIP AND ACTIVITIES

European Youth Parliament Delegate, then Chair	2018 – 2020	Model European Parliament Delegate	2020
• Debated EU policy in international committees; as Chair, ran committee sessions and kept multinational teams on schedule.		• Negotiated positions with delegates from other countries and presented committee proposals to a full plenary.	

SKILLS

CAD: SolidWorks, PTC Creo, Solid Edge, Autodesk Inventor; technical drawing, GD&T (ISO GPS)

Programming: Python, MATLAB, C, C++; ArduPilot, MAVLink, SITL

Analysis: Abaqus (basic FEM, coursework), Microsoft Office Excel

Prototyping: SolidWorks and FDM printing (Bambu Lab P1S) of functional parts at home

LANGUAGES

Croatian · Native	English · Fluent	Italian · Fluent	German · B1, improving
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