ANDREA CESCATO



Aerospace Engineer — Flight Control Laws & Flight Dynamics

Control law design | Robustness analysis | Simulink / Stateflow
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Nerviano, Italy | EU citizen (Italian) | Open to relocation

PROFESSIONAL SUMMARY

Aerospace engineer with nearly three years of industry experience on safety-critical aerospace systems and a **flight control law design** background. Designed a **pitch damper for Level 1 flying qualities and a pitch-attitude autopilot** for a fixed-wing aircraft (6-DOF nonlinear model, trim, linearisation, modal analysis, anti-windup, actuator saturation), and the **attitude control law of a thrust-vectoring rocket** (LQR with integral action) with a 500-run Monte Carlo robustness campaign. In industry, develops Simulink and C/C++ models for closed-loop simulation, defines and automates test campaigns, traces requirements to models and tests in IBM DOORS, and models systems in SysML with Cameo; two years of DO-178C model-based development on the AW249 helicopter.

PROFESSIONAL EXPERIENCE

Control Systems Engineer | Leonardo S.p.A., Electronics Division (employer: ALTEN Italia S.p.A.)

Nerviano, Italy | December 2025 – Present

- Develop and integrate **Simulink and C/C++ sensor models** in the control chain of a pointing system for **closed-loop simulation** and verification of system performance against requirements before hardware is available.
- Define, execute and evaluate **test campaigns in simulation**: methodology, procedures, automated execution with target-trajectory generation, data analysis; Simulink-based automation **cut test execution time by 50%**.
- Derive and trace requirements in **IBM DOORS** down to models and test cases; model system architecture and interfaces in **SysML with Cameo** (MBSE).

Avionic Software Engineer | Leonardo S.p.A., Helicopters Division (employer: TXT e-Tech S.r.l.)

Samarate, Italy | November 2023 – December 2025

- Developed **model-based components in MATLAB/Simulink** for the AW249 with auto-generated code and AFDX communication with the mission computer, in a deterministic real-time environment, under a full **DO-178C** lifecycle with traceability to requirements and test cases.
- Debugged ADA and auto-generated C code during integration, **reducing integration-testing defects by 25%**; designed 20+ avionic display functions (VAPS XT) with real-time coordinate-frame handling.

Flight Control Systems Engineer (R&D Internship) | T4i – Technology for Propulsion and Innovation

Monselice, Italy | February 2023 – May 2023

- Designed and validated the **attitude control law of a thrust-vectoring hybrid rocket** on a 6-DOF nonlinear Simulink model (variable mass and inertia, DATCOM aerodynamics, actuator dynamics and saturation): **LQR with integral action**, gains tuned with Particle Swarm Optimization.
- **Robustness analysis with a 500-run Monte Carlo campaign** on wind and parameter dispersions: attitude errors within 1° in pitch and roll for 99.6% of cases; ±2° pointing in pitch manoeuvres; stable in gusts up to 15 m/s.

Aerospace Design Engineer (Erasmus+ Traineeship) | AIE Engineering

Dublin, Ireland | October 2022 – December 2022

- Preliminary design of an agricultural UAV: mission requirements, propulsion, battery and sensor selection, endurance estimation in Python and MATLAB.

EDUCATION

M.Sc. Aerospace Engineering (taught in English) | University of Bologna

Forlì, Italy | 2020 – 2023 | 100/110 | Pegasus Certificate

- Thesis: optimal attitude control of a thrust-vectored rocket using LQR and Particle Swarm Optimization. Coursework: Flight Dynamics, Guidance and Control of Aircraft and Spacecraft, Attitude Dynamics and Control.

B.Sc. Mechatronics Engineering | University of Padova

Vicenza, Italy | 2017 – 2020 | 101/110

- Thesis: thrust vector control of a space launcher — unstable pitch dynamics, PID with anti-windup and actuator saturation, electromechanical actuator model in Simulink.

FLIGHT CONTROL PROJECTS

- **Fixed-wing stability augmentation and autopilot (MATLAB/Simulink, FlightGear).** 6-DOF nonlinear Cessna 172 model: trim, numerical linearisation and dynamic modes; **pitch damper designed for Level 1 flying qualities** and pitch-attitude autopilot (PID, back-calculation anti-windup, elevator saturation), validated in real-time simulation with FlightGear.
- **Space Shuttle re-entry trajectory optimisation.** Constrained optimal control of the re-entry dynamics over a rotating Earth; angle-of-attack and bank-angle profiles optimised for cross-range and peak heat flux.
- **Model rocket flight data recorder.** Custom PCB with Arduino Nano, IMU and data logger; recorded flight data used to reconstruct attitude and accelerations.

SKILLS

Flight control and dynamics: control law design (PID, LQR, classical), stability augmentation and autopilot, flying qualities, trim and linearisation, modal analysis, actuator saturation and anti-windup, stability margins, Monte Carlo robustness analysis, 6-DOF simulation

Tools: MATLAB, Simulink, Stateflow, auto-generated code, Python, C, C++, ADA, FlightGear, Git, Linux

Process: requirements derivation and traceability (IBM DOORS), MBSE with SysML (Cameo), DO-178C, simulation-based test definition and evaluation

LANGUAGES

Italian (native) | English (C1, IELTS) | French (B1) | German (basic)